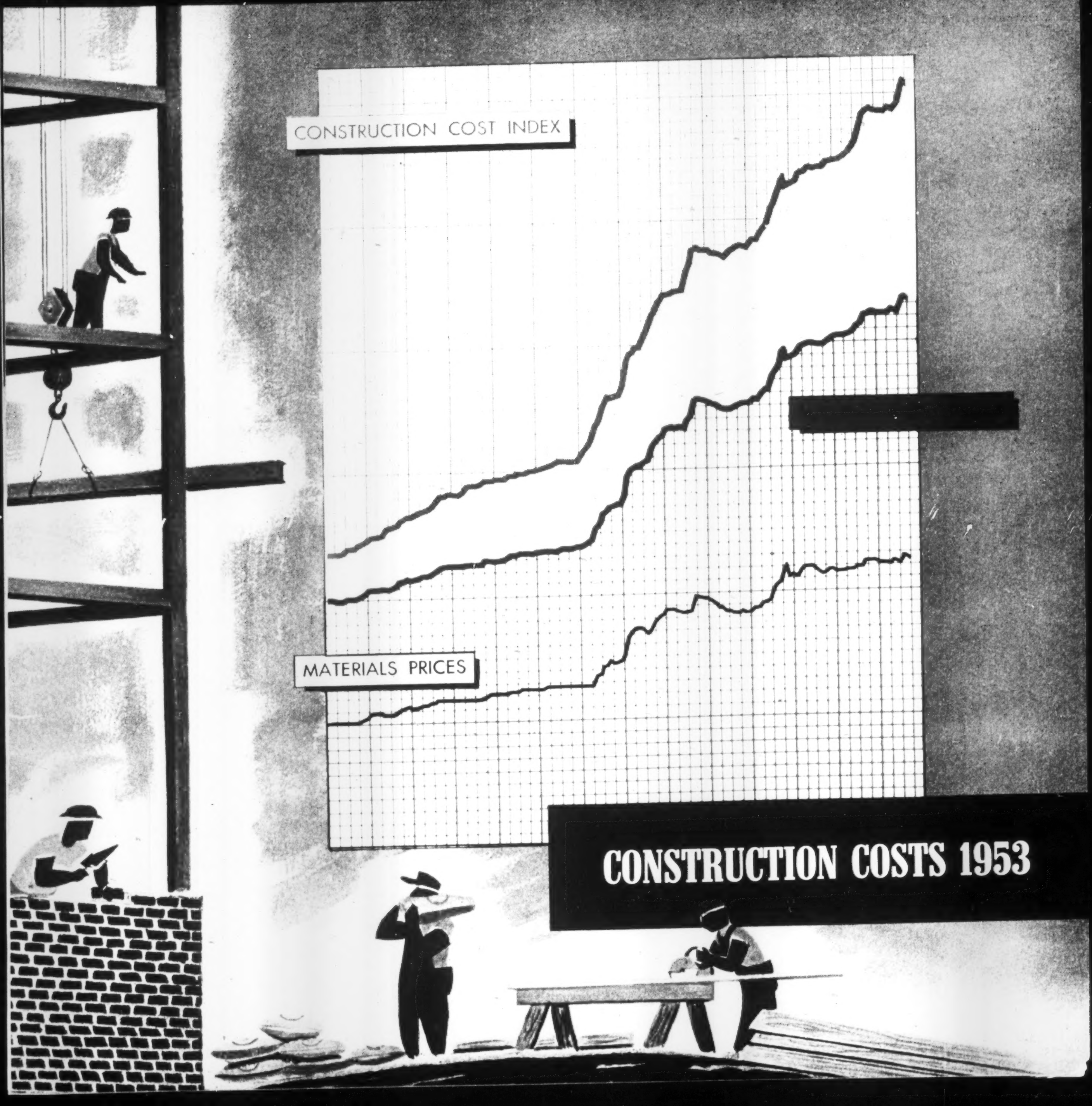
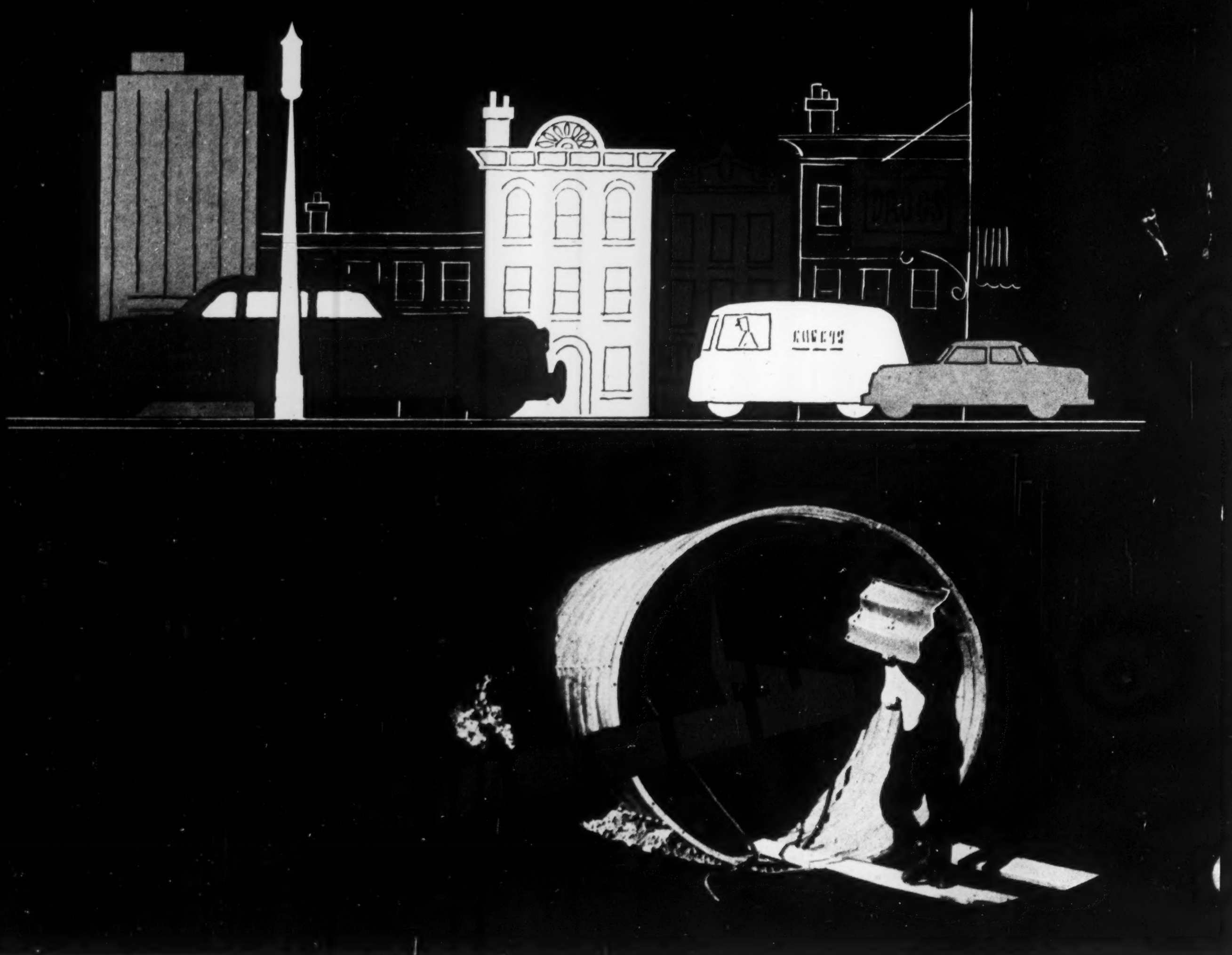
ENGINEERING NEWS-RECORD


CONSTRUCTION COST INDEX
MATERIALS PRICES

CONSTRUCTION COSTS 1953



They saved money going into a hole

It didn't seem right to tear up expensive surface installations, divert traffic and disrupt business when installing underground structures. Tunneling was the logical alternative, but old-time methods made it a laborious, time-consuming job. Armco engineers felt sure there must be a better, less expensive way.

The result was Armco Tunnel Liner . . . a new type of plate having lapped joints and corrugated metal design to provide utmost strength with the least bulk and weight. Now one or two unskilled workman can carry, hold and bolt into place an Armco Liner Section. Only a structural wrench is needed. The tunnel is uniformly strong. Labor costs are low and the job goes fast. Less bulk means less excavation and storage requirements are smaller. You buy no excess metal.

Making products simpler and more efficient has been a prime goal at Armco for more than 40 years. So has the designing of products to meet specific needs. Today you can bring your drainage and construction problems to Armco with full assurance that you will receive all the benefits of long experience, extensive research facilities and a real interest in helping to solve them.

Armco has a complete range of engineered products and convenient, authoritative data to help you. If your problem is difficult or unusual why not talk it over with us.

ARMCO

ARMCO DRAINAGE & METAL PRODUCTS, INC.

SUBSIDIARY OF ARMCO STEEL CORPORATION • MIDDLETOWN, OHIO
Berkeley, California • Middletown, Ohio • South Bend, Indiana • Baltimore, Maryland
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P&H

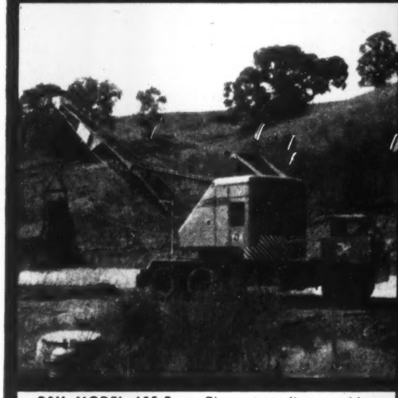
No old-fashioned designs here! P&H gives you performance upon which you can stake a balance sheet of operating costs and profit. P&H leads the way with all-welded steel construction for great staying power . . . lower center of gravity for greater stability and bigger capacity . . . smooth hydraulic control and live roller circle for fast, precise load handling. P&H offers you greater working radius capacities. Literature available on all models.

modern design
CUTS YOUR COSTS!

P&H MITI-MITE—Nothing like it for cutting costs on 101 lifting-digging jobs. Simplified power box design practically eliminates maintenance. Rated at full 10-ton crane capacity on P&H carrier, or mounts easily on any truck of suitable capacity. Ten ton rating is at a greater working radius.

P&H HEAVY-DUTY TRUCK CRANES — "Around the full 360°, no P&H Truck Crane has ever been outlifted." Pick your winner from P&H cost-cutting line-up. 20- to 35-ton capacities at a greater *working radius.*

P&H MODEL 255-A — Most useful excavator in the ¾-yard class. Simple, rugged, with true tractor-type crawlers for safer mobility . . . freedom from maintenance worries. Converts to all services. Long crawlers available.



P&H MODEL 655-B — The outstanding machine in the 1½-yard class — with all the refinements of larger excavators. Available as a heavy-duty or high-lift crane, and with extra-long crawlers for even greater capacity.

P&H MODEL 955-A (2½-yard) — Equipped with the famous P&H Magnetorque* swing — 15 to 25% faster than any competitive machine. *Rock Rated* strength absorbs all the punishment of toughest service. Model 1055-A is the big brother in the 3½-yard class. Both 955-A and 1055-A models offered with long crawlers.

P&H LARGE EXCAVATORS

ELECTRIC SHOVELS — "The Pride of the Pit" with stepless electrical control and *Magnetorque* Hoist Drive. No other machine can maintain such a steady, productive pace. Capacities up to 8 cubic yards.

THE NEW 1855 DIESEL-MAGNETORQUE — Most advanced large excavator ever built. *Magnetorque* units control hoisting, digging, swinging, propelling. Handles up to 10 cubic yards on long-range shovel, yet rides on a single pair of crawler frames.

*T.M. of Harnischfeger Corporation for electro-magnetic type coupling.

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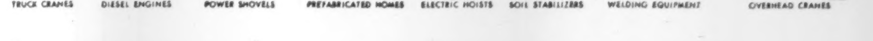
the **P&H** *Line*



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The newest and most modern transit for surveyors and engineers

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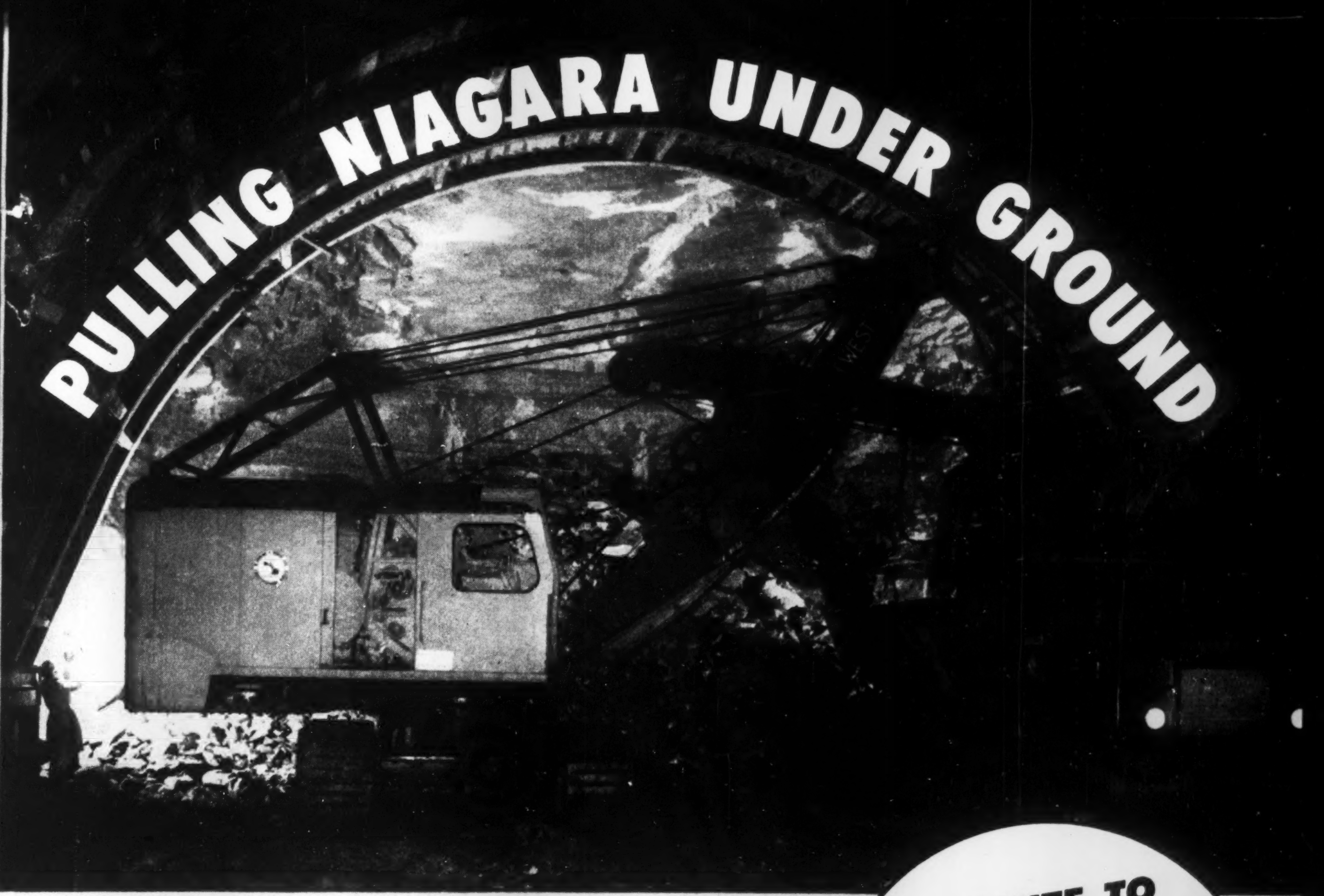
PULLING NIAGARA UNDER GROUND



A SALUTE TO

PERINI-WALSH, Ltd.
RAYNER-ATLAS CO.
and the
ONTARIO HYDRO

● 300 ft. *below* the City of Niagara one of the greatest tunnel jobs of all time is being completed. This is the huge Sir Adam Beck Niagara Power Project being built by the Hydro Electric Power Commission of Ontario, Canada.

Twin Tunnels, 5½ miles long will handle 15,000,000 gallons of water per minute. The excavation involves 9,923,000 tons of rock! The tunnels are being dug in five sections. Perini-Walsh, Ltd., began the carving out of the solid rock using Northwests for its removal. There were four Northwests on this part of the job — a Northwest at each of the headers the contractor is handling. These machines were lowered in sections through shafts and assembled in the cross cuts. Four Northwests are performing similar operations on the sections being handled by the Rayner-Atlas Co. of Niagara Falls, Ont. In addition to these, contractors are using six Northwests on the surface for a total of fourteen Northwests on the job.

Here again Northwests have proved themselves to be *real* Rock Shovels! Here again are two combinations of companies, each of whom has used Northwests for years, adding another endorsement to Northwest's performance record.

If you have a *real* Rock Shovel you never have to worry about output in any kind of digging. Follow the Northwest Crowd!

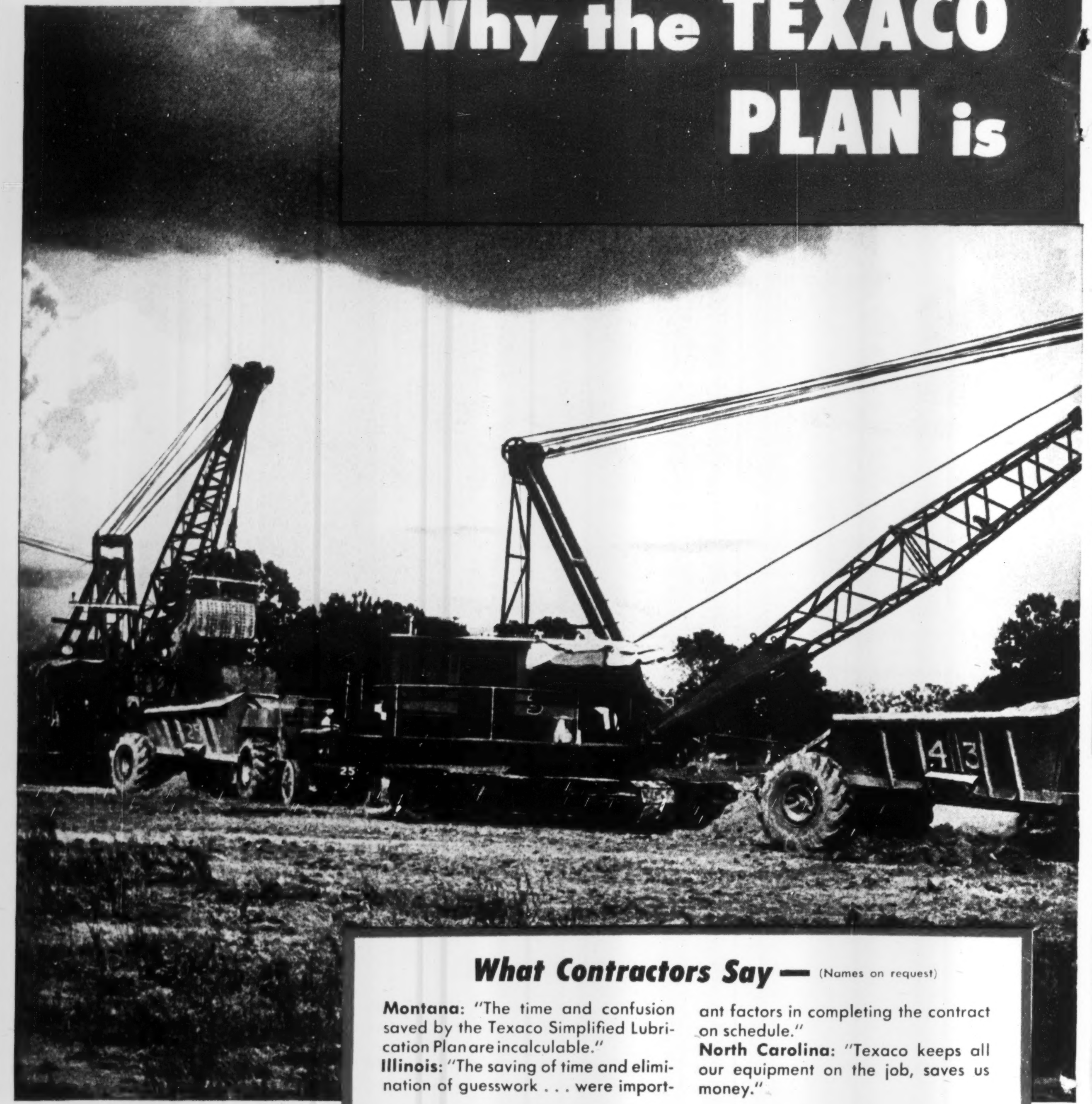
NORTHWEST ENGINEERING COMPANY
1502 Field Building, 135 South LaSalle Street, Chicago 3, Illinois

Has Your Shovel Stood the ROCK TEST

NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

Why the TEXACO PLAN is



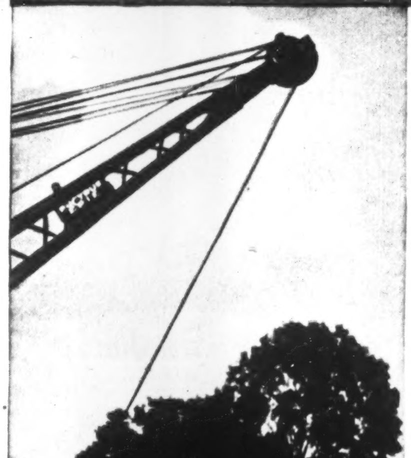
What Contractors Say — (Names on request)

Montana: "The time and confusion saved by the Texaco Simplified Lubrication Plan are incalculable."

Illinois: "The saving of time and elimination of guesswork . . . were important factors in completing the contract on schedule."

North Carolina: "Texaco keeps all our equipment on the job, saves us money."

TEXACO



SIMPLIFIED LUBRICATION always "Tailor-Made"

Just as *no one* lubricant can protect *all* your equipment, so there is *no one* simplified lubrication plan that is equally good at all times and on all jobs. And that is why the Texaco Simplified Lubrication Plan is always tailor-made for the individual requirements of the project in hand. It is designed especially for large operations where a wide variety of equipment is used.

A Texaco Lubrication Engineer surveys your equipment, studies the work to be done, and then recommends the fewest possible lubricants — *usually no more than six!* — that will give *all* your major equipment complete protection. The following is an example:

Chassis and other plain bearings: Use *Texaco Marfak* — it won't pound or squeeze out.

Wheel and other anti-friction bearings: Use *Texaco Marfak Heavy Duty.* No seasonal change required.

Engines, heavy duty gasoline and Diesel: Use the heavy duty member of the *Texaco Ursa Oil* series recommended for your particular engines and operating conditions.

Track rollers (sleeve-type): Use *Texaco Track Roll Lubricant.* It protects against dirt and moisture.

Rock drills, and other air tools: Use *Texaco Rock Drill Lubricant EP.* It protects against wear and rust.

Air compressors: Use the Texaco air compressor oil recommended for the particular operating conditions.

Let a Texaco Lubrication Engineer help you set up the Texaco Simplified Lubrication Plan especially designed for you. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

Gateway BUILDING PRODUCTS for the General Contractor

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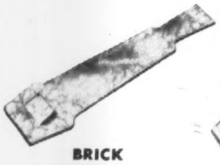
Concrete Inserts

Type "E" Type "A" Type "T"

16 Styles of Concrete Inserts
of Malleable and Steel.

Anchoring Devices

for Brick, Stone, and Tile.



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Dowel Caps

GATEWAY ENGR. CO.
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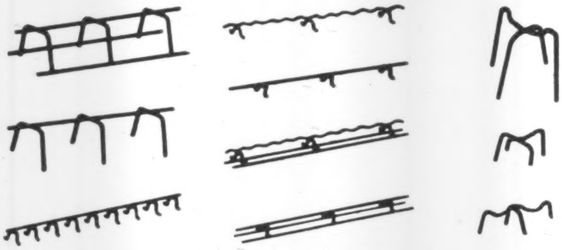
For ¾" and 1" Plain Round Bars

Bar Supports & Spacers



BAR SUPPORTS and SPACERS — Accessories for Reinforcing Steel Erection . . .

Pipe Hangers

Fig. 255

Fig. 375

Fig. 260

Fig. 316

Fig. 258

Fig. 252

Fig. 269

Fig. 254

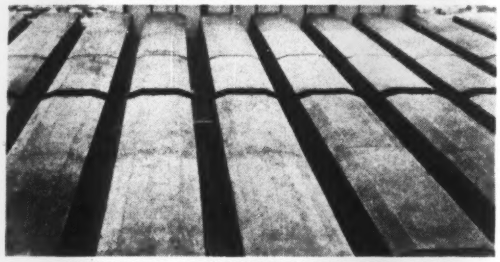
Fig. 251

Fig. 312

ADJUSTABLE PIPE HANGERS, Pipe Supports, Pipe Brackets for all purposes . . .

PANS for

CONCRETE JOIST CONSTRUCTION



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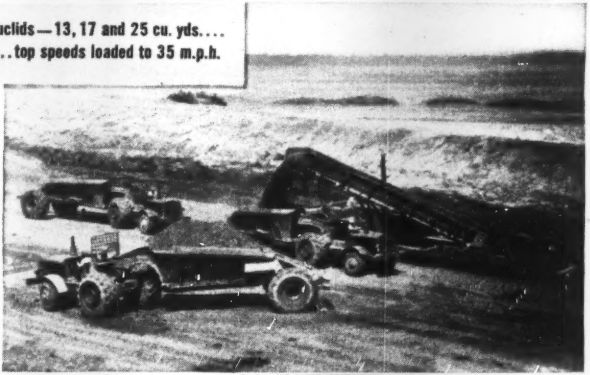
"Eucs"

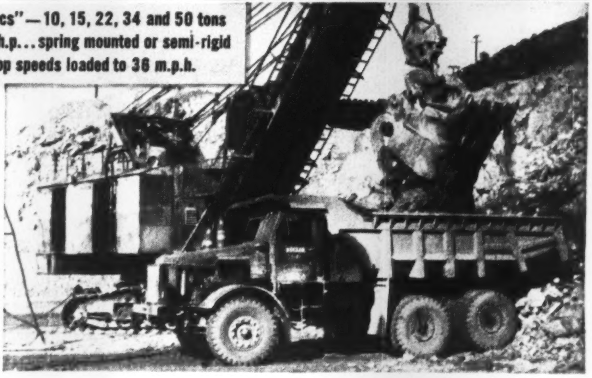
SURE DO THE JOB!

Euclid Scrapers—12, 15.5 and 18 cu. yds. struck...190 to 400 h.p. engines... top speeds, loaded to 30 m.p.h.

Bottom-Dump Euclids—13, 17 and 25 cu. yds.... 190 to 300 h.p...top speeds loaded to 35 m.p.h.



Rear-Dump "Eucs"—10, 15, 22, 34 and 50 tons ...125 to 600 h.p...spring mounted or semi-rigid drive axles...top speeds loaded to 36 m.p.h.



On construction and mining jobs the world over you'll hear owners say, "those 'Eucs' make more money for us and do more work than any equipment we've ever used." Operators, too, like "Eucs" because they're easy to handle and have plenty of what it takes to haul and dump big loads in tough going.

There are lots of reasons why men who know earth moving equipment specify Euclids, but they all add up to one simple fact . . . "Eucs" move more loads per hour at the lowest cost per ton or yard of material moved. Profitable performance on all types of work is proved by the fact that over 60% of all Euclid equipment sold is repeat business from satisfied users.

When competitors are using "Eucs" to move dirt or rock faster and cheaper than you are, you can't afford to pass up the cost cutting advantages you get in Euclid equipment. For the recommendations of a hauling equipment specialist and a production and cost estimate on your job, get in touch with your Euclid distributor . . . there's no cost or the slightest obligation.

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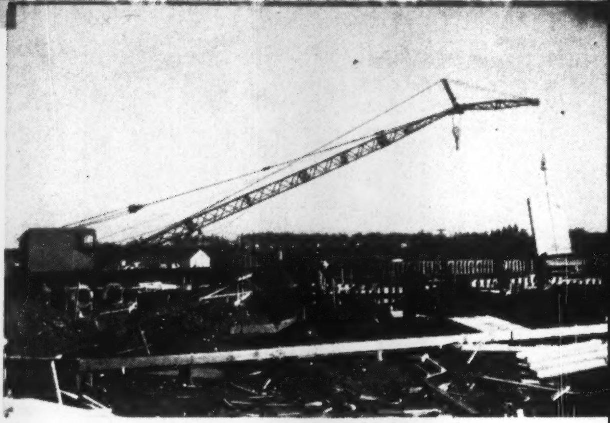
FOR MOVING EARTH, ROCK, COAL AND ORE

Sing A Song of Savings with The Tuffy Quartet

Tuffy SLINGS

"Couldn't Kink Them, Even When We Tried," Says owner of an Eastern construction company.

Only Tuffy Slings give you the patented 9 part machine-braided wire fabric construction that resists knots and kinks . . . stands up longer than ordinary wire rope under rugged use. The 9 parts are interlaced in an exclusive way, forming a fabric that can be repeatedly bent around small radii and abrupt corners. You'll find Tuffy Slings are extra flexible, extra strong—and they can save you up to 40% on sling costs! Remember, they're proof tested to *twice* the safe working load.

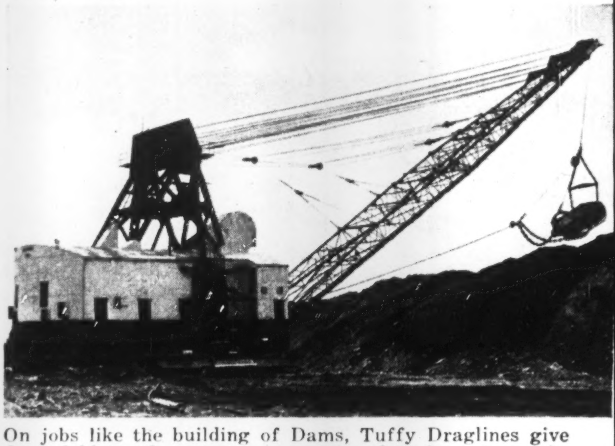


No need to worry about knotting and kinking when you use Tuffy Slings.

Tuffy DRAGLINE

"Best Wire Rope Service . . . on 33 Draglines" Says Superintendent of a Florida rock producing company.

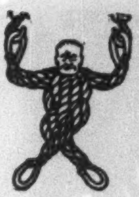
Easy to handle, Tuffy Draglines are designed to take sharper bends, angle pulls and rapid line speed. Wires of finest steel provide extra flexibility without sacrificing other qualities . . . and you'll find Tuffy Draglines have a super tough construction for maximum resistance to drum crushing abuse, crawling on guide roll flanges, etc. Union-formed (pre-formed) Tuffy construction stands up longer than ordinary wire rope under line pull, multiplied shock of load on slack line and the stress of all types of material! Tuffy is easy to order, too! All you need is—length, diameter and the name . . . "Tuffy!"



On jobs like the building of Dams, Tuffy Draglines give dependable performance on any type of equipment.

union Wire Rope corporation

Specialists in Wire Rope and Braided Wire Fabric



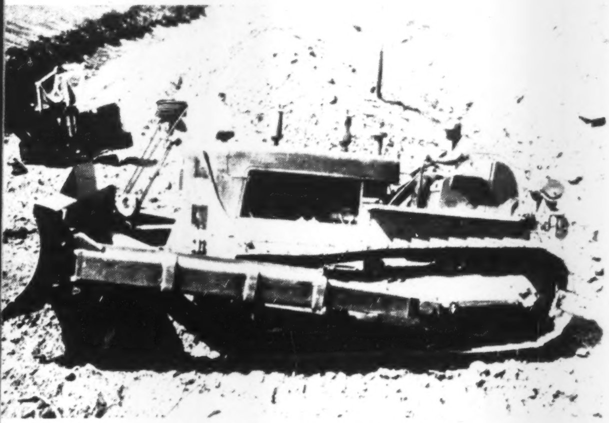
Tuffy SLINGS

Tuffy SCRAPER ROPE

Tuffy DRAGLINE

Tuffy DOZER ROPE

Grading jobs, like this one near Cadillac, Michigan, call for Tuffy Scraper Rope.



Moving overburden at this West Virginia strip mine is the kind of day-in, day-out job where Tuffy Dozer Rope steadily proves its extra worth.

Tuffy SCRAPER ROPE

"Outlast Other Rope Almost 2 to 1" Says a Middlewestern Contractor

Wheel scrapers need a wire rope that will stand up under more varied strains and stresses than hoist or other standard ropes . . . and Tuffy Scraper Rope fills the bill! Each strand is preshaped, which relieves it of internal stresses. This leaves the full strength of every strand free to carry its share of the rope load. Tuffy Scraper Rope is flexible enough to stand up under sharp bending, hug sheave grooves, and wind snugly and smoothly on the drums. Tuffy is so designed to resist drum crushing caused by rope crossovers. What's more, no complicated specifications are necessary when you order Tuffy! Just ask for Tuffy Scraper Rope and specify diameter and length.

Tuffy DOZER ROPE

"A Reel of Tuffy Dozer Can Save Up To 300%."

Wire rope gets extra-rough service on a dozer, and Tuffy Dozer Rope was specially created for the job. But Tuffy engineers went even further . . . they designed a reel to mount on the dozer and help you stop rope wastage. When rope is cut or crushed on the drum, you just feed through enough from the reel to replace the damaged part. You save the 40′ to 50′ that would normally be thrown away! Users report an increase in service of up to 300%! And you'll find replacement takes less than *half* the time usually needed! Tuffy Dozer is a special ½″ wire rope, available in 150′ reels. Use Tuffy on your Dozer —and *save!*

SEND FOR THESE FREE FOLDERS

Tuffy
Slings
AND RIGGERS' MANUAL...
Tuffy DRAGLINE
UNION Wire Rope
Tuffy
Tuffy DOZER ROPE

union Wire Rope corporation

Specialists In Wire Rope and Braided Wire Fabric

2228 Manchester Ave., Kansas City 3, Mo.

Please send me the illustrated folders I have checked below:

☐ Tuffy Dragline ☐ Tuffy Scraper Rope

☐ Tuffy Dozer Rope ☐ Tuffy Slings

Firm Name________________

By________________ Title________

Address________ City________ State________

Traffic-stopper . . . sales-builder! This 100 x 160-foot Butler building gives the Shult Implement Company, El Campo, Texas, a sales "showcase" with permanent, low-cost space for displays, offices, parts and service departments.

This main street beauty is a "showcase" BUTLER steel building

Traffic slows as drivers take a second look. Folks on foot pause to browse and stay to buy. The cash registers never seem to stop "talking." Yes, the eye-catching beauty of this modern store—that's a Butler steel building at heart—does more than tickle the owner's vanity. It actually increases store traffic—sales and profits!

You, too, can profit by doing business in a building that's an attractive "showcase" for your merchandise. You don't have to be made of money, either. You can get costly custom-built beauty at mass production prices by combining a regular Butler building with wood, masonry, and glass. Your architect can economically create the individuality that coaxes more customers inside.

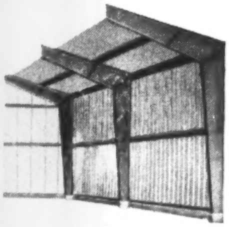
Butler buildings provide post-free interiors for shops, stores or offices that are 100 per cent usable. They can be economically heated—insulated for year-around comfort. Insurance rates are low.

You don't need a big bankroll to own a beautiful shop or store, tailored to your individual needs. Write today for full details and the name of your nearby Butler dealer!

Here is why BUTLER is a better buy

Every Foot of Floor Space is Usable

There are no interior posts or columns to waste space and create work-slowing "bottlenecks." Rigid-frame construction also shrinks maintenance costs . . . extends building life.

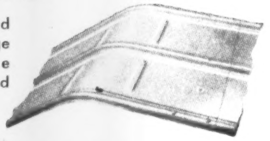


Fast Erection . . . Easy Expansion

Precision-punched and dimensioned bolt holes speed erection—simplify expansion or dismantling and moving. Galvanized bolts, with Neoprene rubber washers, lock deep-corrugated sheets firmly to the sturdy frame.

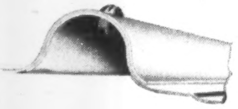
Weatherproof Protection

The one-piece, die-formed roof ridge eliminates ridge roll—helps to make the building leakproof and weather-tight.



Triple-Strength Corrugated Sheets

Butler sheeting, with deep-drawn corrugations formed on 12-inch centers, is three times as strong as ordinary corrugated sheets. Overlapping corrugations bolt tightly together for maximum strength and weather protection. Available in steel or aluminum.



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The neat, die-formed eaves—which bolt to the roof sheets—add to the appearance of Butler steel buildings . . . increase the strength of the eaves . . . help insure weather-tightness.

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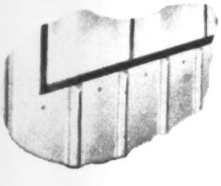
Where corrugated sheets meet windows or the foundation, they are tightly crimped for a snug fit that keeps out snow, moisture and rodents.



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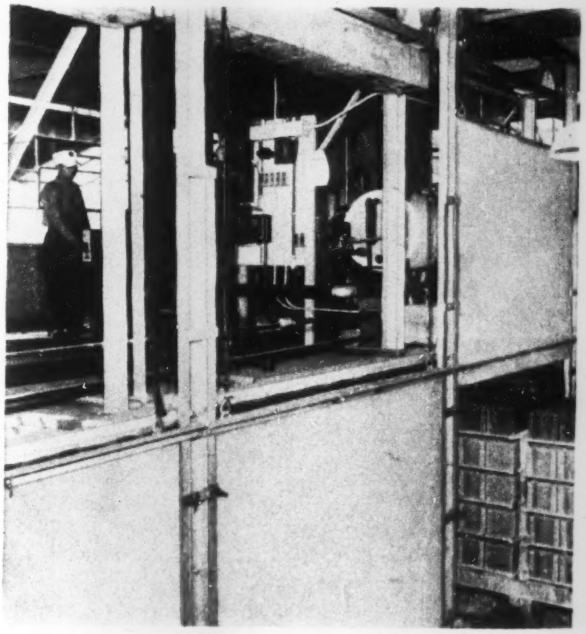
Here's How

Kiln-top installation of Cleaver-Brooks gas-fired steam boiler provided space for 2 extra kilns



...eliminated coal handling problems and modernized straight line cinder block production for Ellis Concrete Products Co.

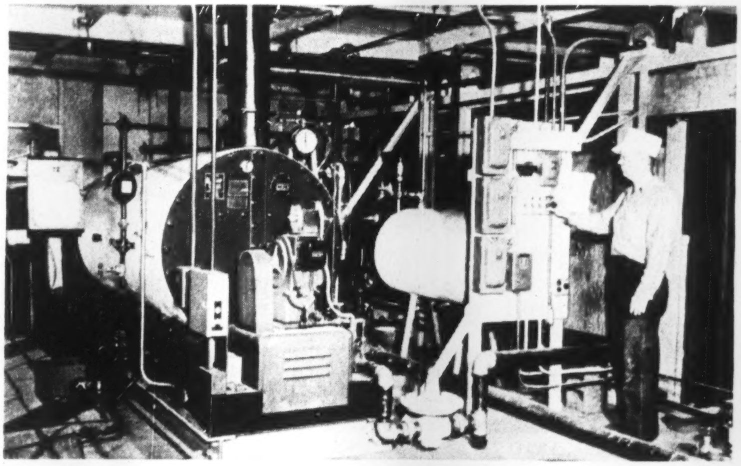
There's no reason to penalize future expansion and profits because your boiler is a space hog. Look how Ellis Concrete Products Co. neatly solved a difficult space problem . . . gained new steam efficiency . . . and modernized cinder block production . . . without adding new construction.

Installation of a Cleaver-Brooks self-contained, gas-fired 50 HP steam boiler *on the roof of their kilns*, released space on the production level, formerly occupied by a cumbersome coal-fired boiler. Steam is now available with push-button convenience. No longer is it necessary to bank fires on weekends and holidays, or transport coal in wheelbarrows from rail siding into boiler room.

The Cleaver-Brooks boiler installation completed modernization of Ellis' straight-line production. Mix is pressed and shaped, loaded on cars, pushed into one end of kiln, cured and pulled from other end for shipment or storage. The 50 HP, 125 psi completely automatic boiler is capable of simultaneously curing the contents of 2 of the present 10 kilns.

Any one of 13 standard sizes of Cleaver-Brooks boilers, 15 to 500 HP, 15 to 250 psi (for gas, oil or combination gas/oil operation) can give you similar space-saving advantages. In addition, you get such features as four-pass fire tube construction, forced draft and guaranteed 80% efficiency from full load to 30% of rating.

LOOK INSIDE YOUR PLANT... Chances are you, too, may find that Cleaver-Brooks boilers can solve your space problems and give you greater steam efficiency. Write today for complete information. CLEAVER-BROOKS COMPANY, Dept. L. 393 E. Keefe Avenue, Milwaukee 12, Wisconsin.



Installation on kiln roof kept steam and fuel lines short and direct. The exceptionally low 5'7" overall boiler height and simple exhaust vent solved headroom requirements. Heavy-duty channel iron frame safely supported boiler weight evenly over prestressed-concrete floor slabs.

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MORE PLUS FEATURES . . . Tool boxes large enough to carry complete assortment of tools . . . Engine and Compressor cooled by water and unit can be operated with doors in place . . . Dual fan belts.

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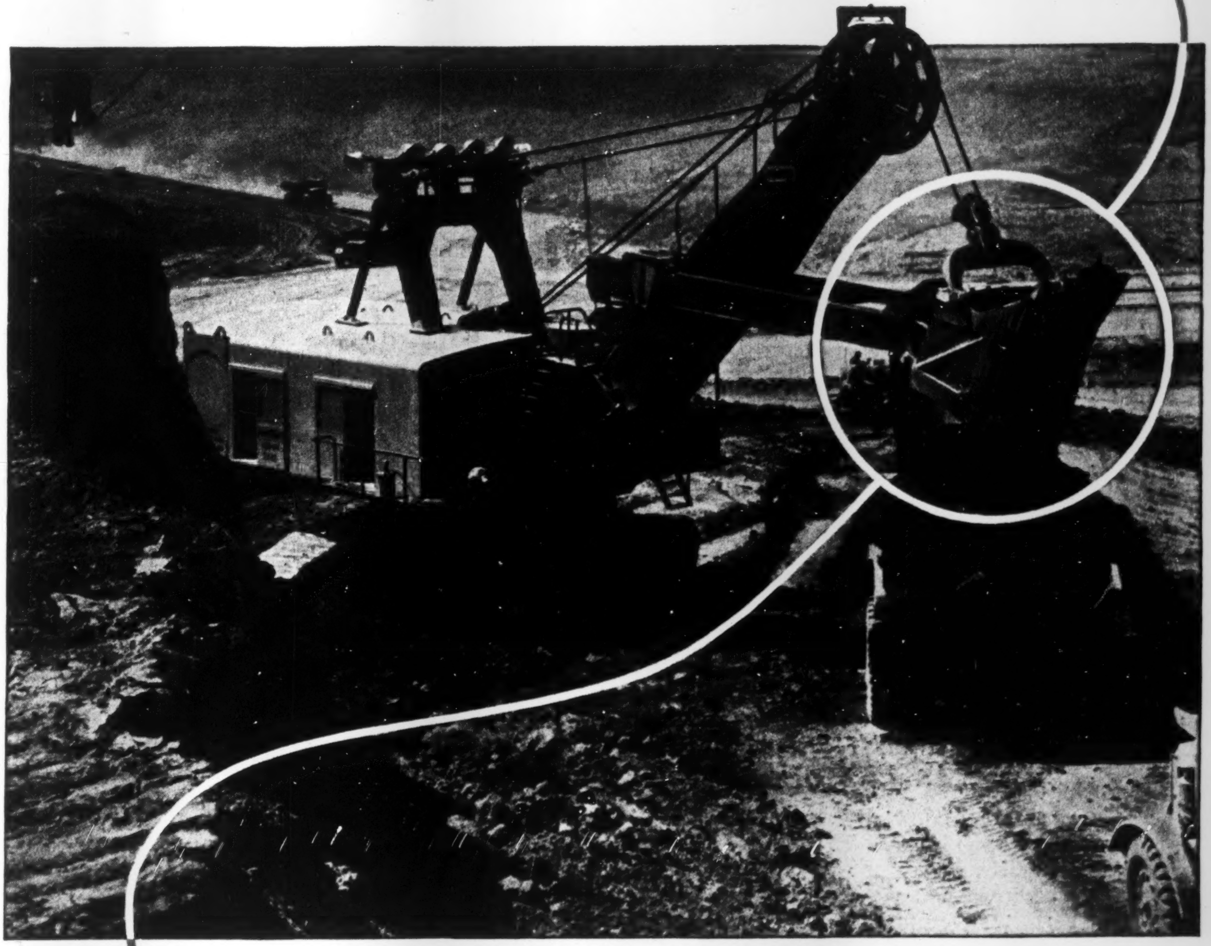

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for super-speed fastening into steel and concrete

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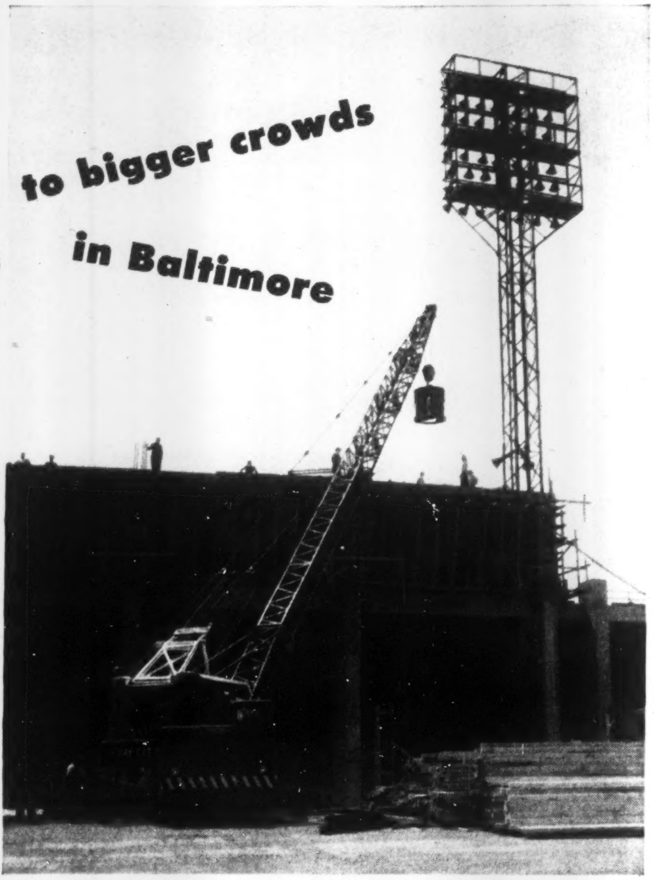

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Handy pocket-sized book of facts and features tells you why "all lifts are easier with a CraneMobile." It's packed with interesting information, it's nicely illustrated, and it's yours for the asking. Just write us.

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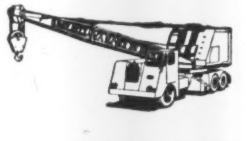
More baseball and football fans than ever before will show up to root for the home teams in Baltimore. That's because the Memorial Stadium, home grounds of the Baltimore Orioles baseball team and the Baltimore Colts football team, is being enlarged to provide a permanent seating capacity for more than 58,000 people. Joseph F. Hughes & Co., using BAY CITY CraneMobile, is handling the construction on this job. Operating with an 85-ft. boom, the long reach and high lift of CraneMobile enables them to place concrete and other materials for the upper deck construction with speed and precision. Whether you're excavating or erecting, CraneMobile will give you the same efficient performance and dependability. It will pay you to get all the facts about CraneMobile from your BAY CITY dealer.

BAY CITY



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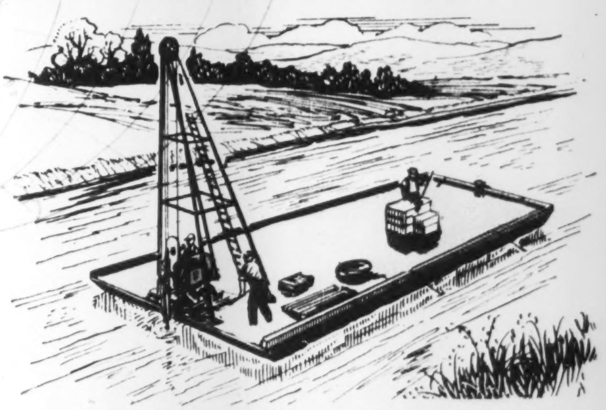
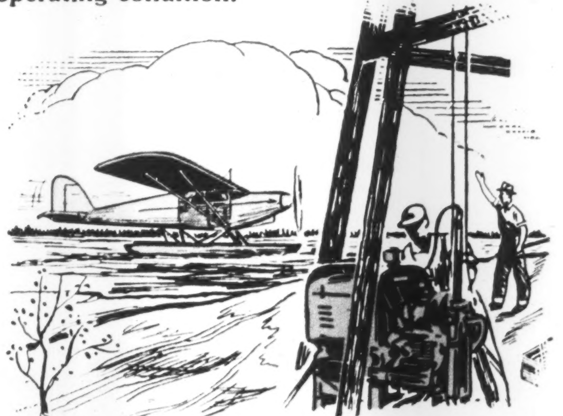


For more than sixty years Sprague & Henwood, Inc. has been a leader in the field of Contract Diamond Drilling. During this long period our crews have completed thousands of contracts successfully in every corner of the globe—under every conceivable operating condition.



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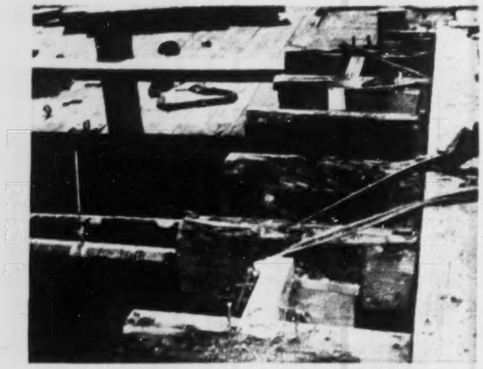
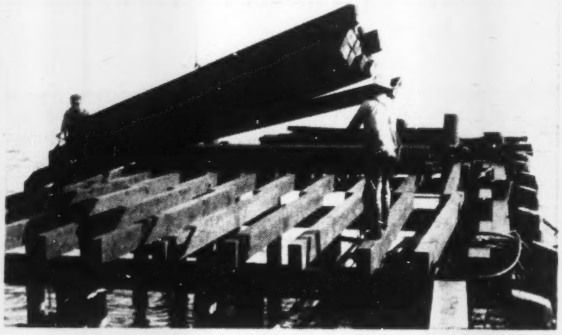


BEFORE—Stringers and wales of this finger pier at the U. S. Navy Electronics Lab in San Diego were badly rotted before repair.

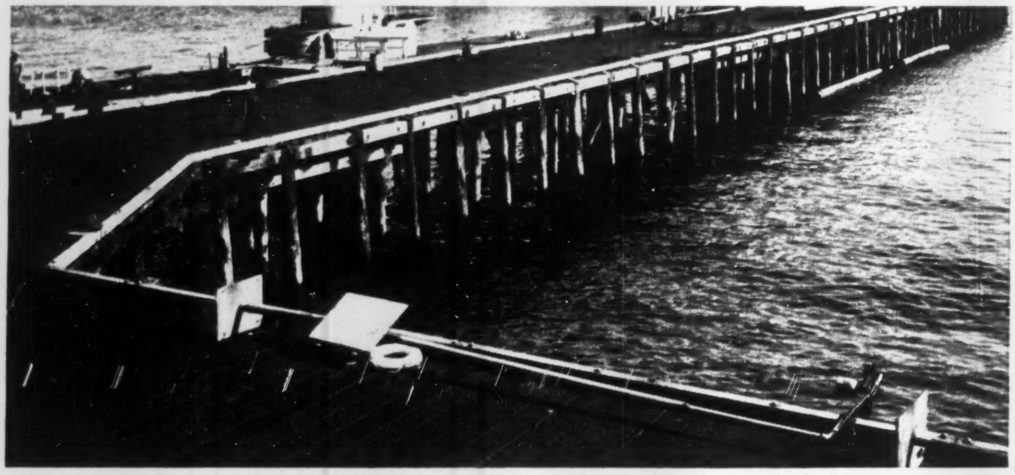
AFTER—Rotted material is replaced with wood pressure-treated to a 6# retention of Monsanto Penta-in-oil. This clean preservative extends the normal service life of the exposed wood up to 5 times.



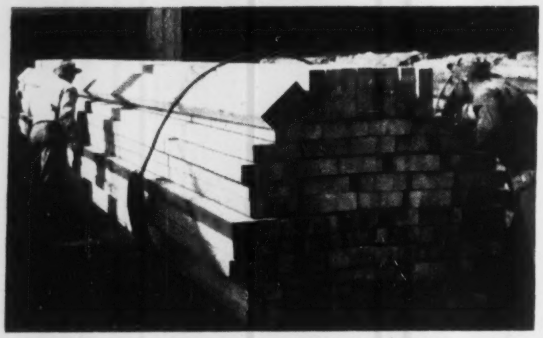
Extending Life of Navy Pier Stringers and Decking...with Monsanto PENTA

Official Photographs, U. S. Navy

Wood Treater: Warren Southwest, Inc., Wilmington, Calif.



New penta-treated 4 x 12 decking is paintable, will not bleed. A total of 130,000 board feet of decking was pressure-treated before construction.



Penta treatment is available at plants in 61 cities. The Monsanto sales office near you can supply the name and address of the plant in your area.

WRITE *for "Specify Penta," an informative booklet giving detailed application information. Monsanto Chemical Company, Organic Chemicals Division, 800 North Twelfth Blvd., St. Louis 1, Missouri.*

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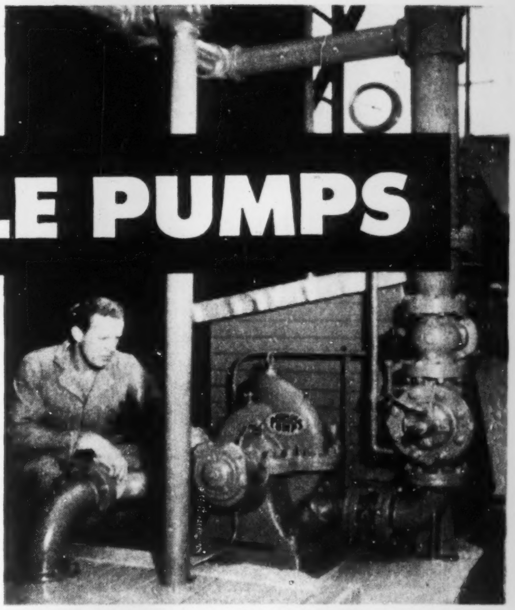

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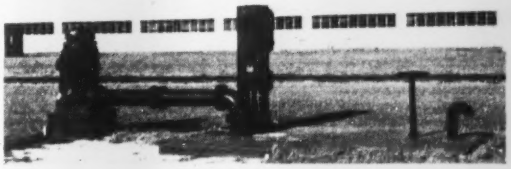
THESE *Horizontal* BOOSTER PUMPS

Available in 2, 3, 4 and 5-stage designs for high head pumping. These Type TU pumps handle water and process liquids. Capacity range: to 3500 gpm; head range: to 1600 feet; hp range: to 350 hp. Pumps are of horizontal split-case design for easy maintenance. Quality construction throughout. The pump shown is operating on a cooling tower system. Request Peerless Bulletin B-1400 for complete Type TU pump details and description.

SUCH AS

THESE *Vertical* TURBINE PUMPS FOR PLANT WATER SUPPLY

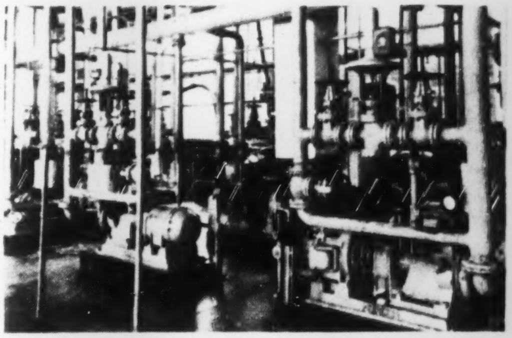
Peerless is America's largest selling vertical turbine pump. Here's why. Peerless offers many "years ahead" features in design and construction *plus* the widest range of sizes, capacities, heads, horsepower, from which to select the right pump for your water lifting job. The pump shown is one of 23 used to supply water for an ethical drug manufacturer. This type of pump is also used with modifications as the plant's fire protection pump. As such it has full approval of the Underwriter's Laboratories Inc. Request Bulletin B-141 and Bulletin B-152 describing this type of pump for these applications.



SUCH AS

THESE *Horizontal* PUMPS FOR GENERAL PURPOSE PUMPING

One of the broadest ranges of horizontal pump types, sizes and horsepower is offered by Peerless in its face mount and flexible coupled end-suction Type PE and PB pumps. This line is the famous Peerless Fluidyne line. Widely applied to hundreds of water handling services where the combination of dependability, efficiency, economy, good appearance and compactness is available in one pump. The Type PB pumps illustrated are installed for a tire manufacturer and are used to move the hundreds of tons of water required daily for plant processes. You can buy and apply this line of pumps right from Peerless Bulletin B-2300. Request it.



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- ☐ **TYPE TU PUMPS** Bulletin B-1400
- ☐ **VERTICAL FIRE PUMPS** Bulletin B-152
- ☐ **VERTICAL DEEP WELL PUMPS**—Bulletin B-141
- ☐ **END SUCTION PUMPS** Bulletin B-2300

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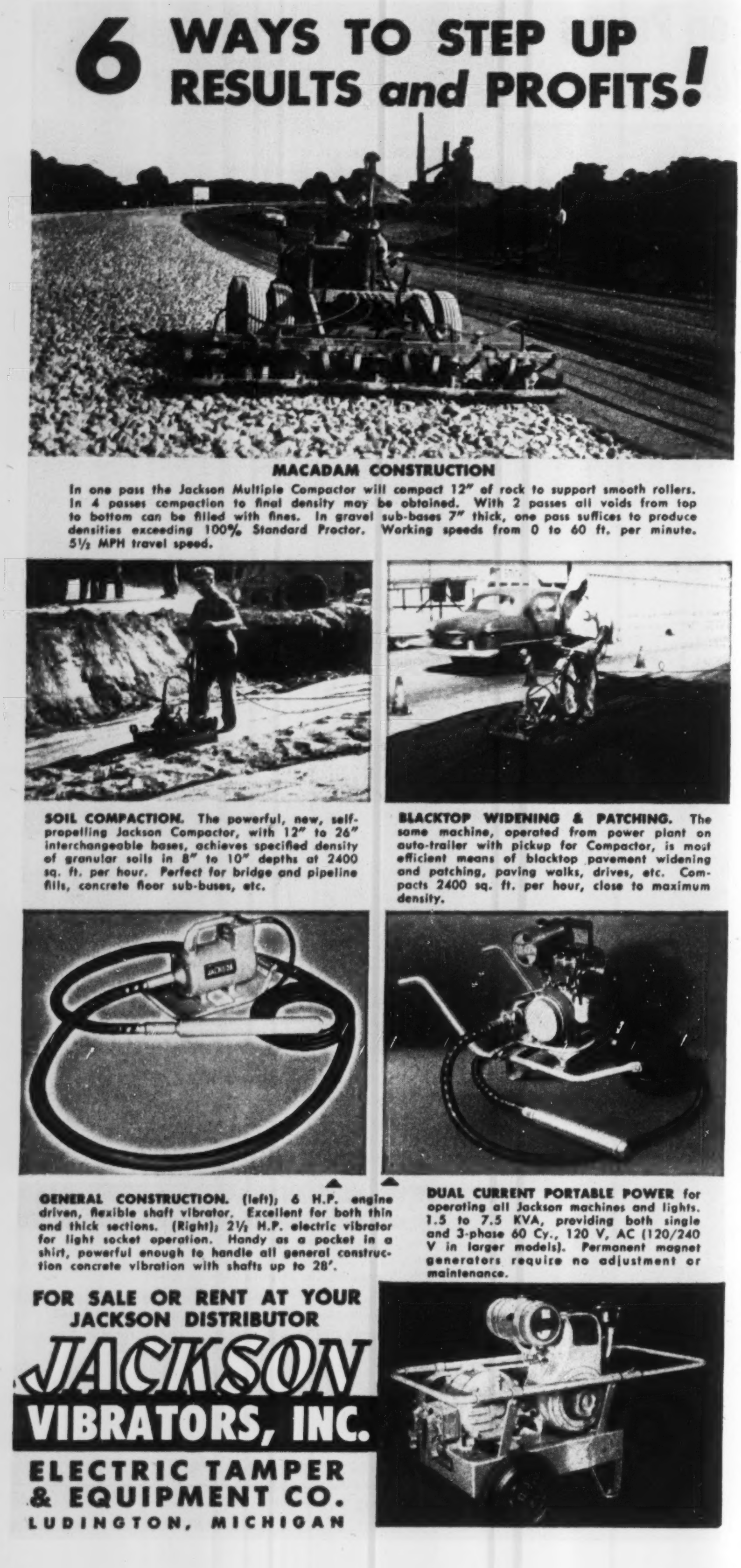

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In one pass the Jackson Multiple Compactor will compact 12" of rock to support smooth rollers. In 4 passes compaction to final density may be obtained. With 2 passes all voids from top to bottom can be filled with fines. In gravel sub-bases 7" thick, one pass suffices to produce densities exceeding 100% Standard Proctor. Working speeds from 0 to 60 ft. per minute. 5½ MPH travel speed.

SOIL COMPACTION. The powerful, new, self-propelling Jackson Compactor, with 12" to 26" interchangeable bases, achieves specified density of granular soils in 8" to 10" depths at 2400 sq. ft. per hour. Perfect for bridge and pipeline fills, concrete floor sub-buses, etc.

BLACKTOP WIDENING & PATCHING. The same machine, operated from power plant on auto-trailer with pickup for Compactor, is most efficient means of blacktop pavement widening and patching, paving walks, drives, etc. Compacts 2400 sq. ft. per hour, close to maximum density.

GENERAL CONSTRUCTION. (left); 6 H.P. engine driven, flexible shaft vibrator. Excellent for both thin and thick sections. (Right); 2½ H.P. electric vibrator for light socket operation. Handy as a pocket in a shirt, powerful enough to handle all general construction concrete vibration with shafts up to 28'.

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READER COMMENT

Credit due

SIR: In the articles covering Houston's new water project on the San Jacinto River "Lightweight dam to pass heavy weight flows over new diffuser spillway," pp. 43-48 of the Aug. 20 issue and "Waterworks gets outdoor industrial look," pp. 51-54 of the Sept. 10 issue, the names of two engineers who have had much to do with the project from its inception were omitted.

G. L. Fugate has been chief engineer and Clyde R. Harvill, superintendent of the San Jacinto River Water System. Both of the engineers are on the staff of Houston's Water Department.

JAMES A. LEE, CHIEF
Houston News Bureau
McGraw-Hill Publishing Co.

Prestress costs need study

SIR: The comparative economics of prestressed concrete bridges in this country appear to be in need of clarifying analyses. To quote the comparative costs of prestressed construction as against precast and cast-in-place concrete bridges in Great Britain and elsewhere in Europe is of interest, but such comparisons have but little relation to reality for constructions in the United States and Canada, where the all-important economic factors of the relation of labor to material costs are very different.

I agree with Mr. Hadley ("Prestress Economy Doubted," in ENR Sept. 3, p. 10) that much of the claimed economy for prestressing does not stand up under analysis. The exception that Mr. Hadley quotes—the Lower Tampa Bay Bridge in Florida—indicates that the governing overall cost factor was the elimination of falsework. The Tampa Bay alternative and competing design was for cast-in-place T-beam construction. It would have been more to the point if a second alternative design had been studied—one for a precast T-beam construction, which would also have avoided the use of falsework and the high labor and material costs of prestressing.

A little more thorough and cold-blooded analysis is in order if we wish to arrive at the true economics of prestressed concrete bridges here.

The detailed descriptions of many prestressed structures in Europe appearing in our engineering literature, such as that of the long continuous girder bridge over the Danube Valley

(*Continued on page 28*)

Architects:
Swanson Associates

Torry Elementary School
Birmingham, Mich.

General Contractors:
J. C. Nielson and Co.

PYROFILL Roof Contractors:
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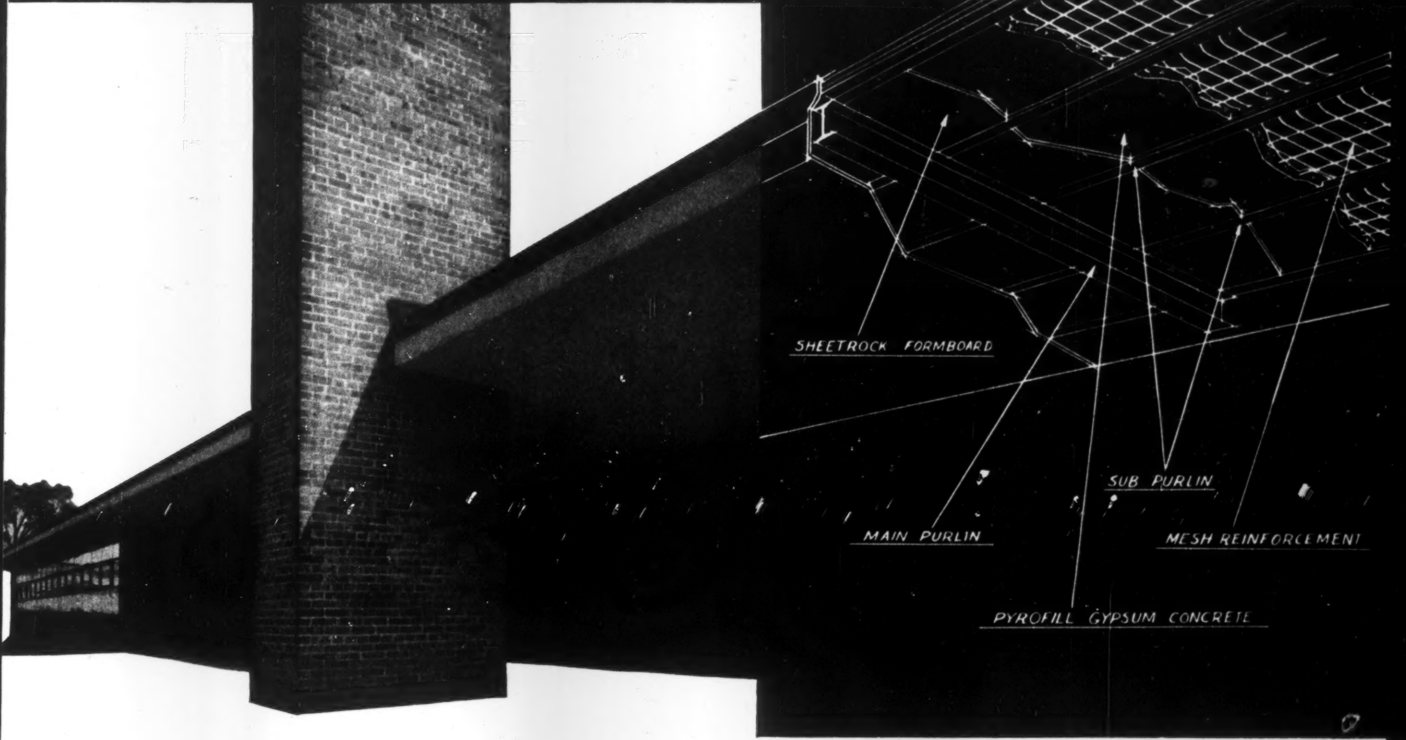
all roof deck requirements met here with

PYROFILL*

THE ORIGINAL GYPSUM ROOF DECK



Roof deck requirements for a school as modern as this one were many and varied—the versatility of PYROFILL made it the logical choice. It's fireproof, strong, lightweight; meets desired heat loss requirements. With the wide choice of formboards available, it can be adapted to almost any type of roof or building. And PYROFILL Gypsum Concrete is economical, quickly installed—a single crew often pours more than 20,000 feet in one day. PYROFILL poured-in-place roof deck can very well be the answer on your next project. Why not keep it in mind?

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For the long haul... Autocar relies on RB&W bolts

Famous truck builder rates them best for ease of assembly and accessibility

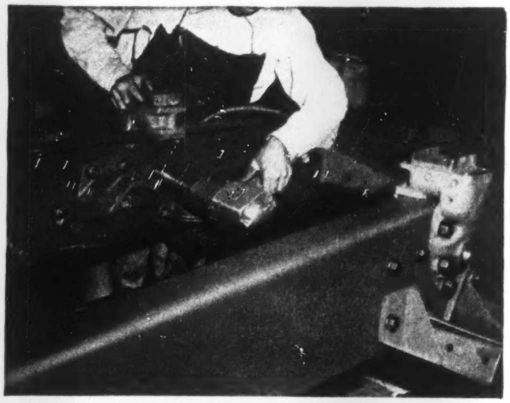
It's been a long time since the Autocar people switched from riveted to bolt-and-nut construction. Here's how it happened:

Two Autocar engineers took off on a coast-to-coast run to shake the bugs out of a new test model. Things went well until a riveted spring bracket broke. It took an entire day just to chisel through the rivets because it was hard to get at the bracket.

From that day on, it was *accessible* bolt-and-nut construction exclusively for all Autocar trucks. And Autocar standardized on RB&W bolts. One dividend from using these rugged bolts is that Autocar can specify higher-strength material than is practical for riveting. Furthermore, tests on structures like bridges show that rivets frequently loosen. This doesn't happen to bolts on Autocar frames.

Where you want to join structural members firmly together so they'll *stay* together for good, high-strength bolting is often your best bet.

As the leading manufacturer of all kinds of fasteners, we're in the unusual position of always being able to recommend and supply the right ones for all your needs. Write to RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY, Port Chester, N. Y.



FASTER FASTENING is achieved in the Autocar plant at Ardmore, Pa., by using air tools like the one shown here to run up RB&W nuts on RB&W bolts on an Autocar truck frame. In addition to making tight, accessible joints, bolting effects substantial assembly savings.

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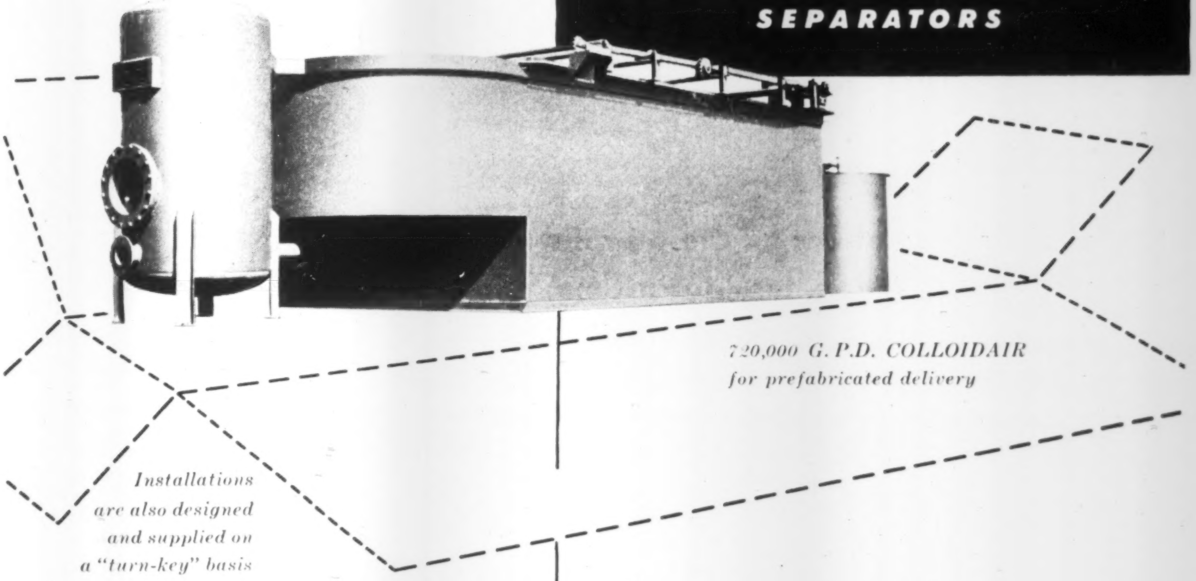

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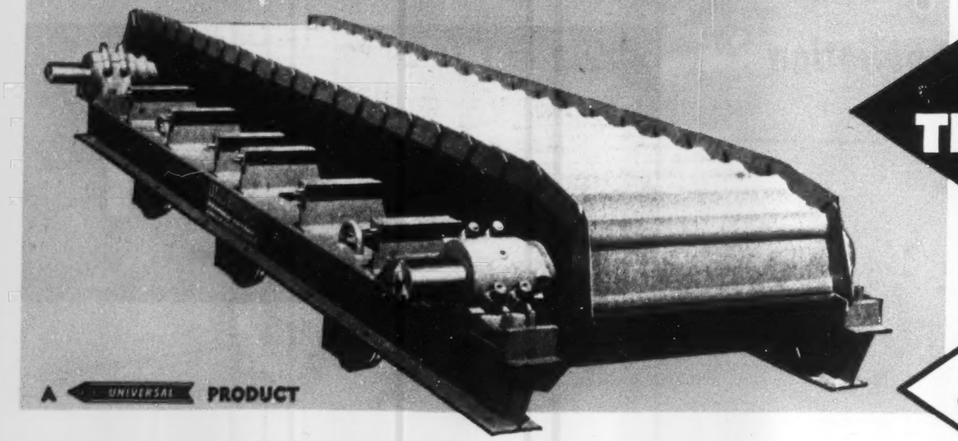

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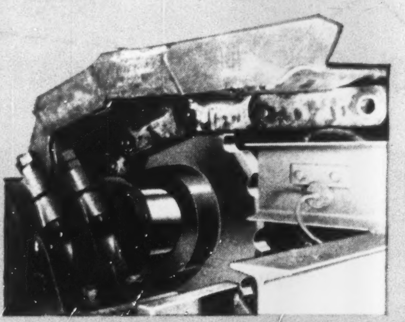
- Heavy duty ½" high carbon steel flights.*
- Head and tail shaft take ups.
- New reinforced T-Section welded to bottoms of flights and against chain for maximum strength and rigidity.
- Heavy steel chain welded integral with flights and T-Section, with easily replaceable work hardened manganese steel bushings, and extra large case hardened steel pins.
- Large diameter, wide face cast steel carry rollers lubricated from one side.
- Simple design permits feeder parts to be easily replaced without removing upper hopper or lower structure.

*Manganese steel flights available.

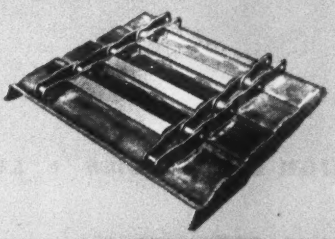
Available in 36, 42, 48 and 60" widths with or without hoppers and side boards, and with a type of drive to fit any installation.

For toughest going in heavy duty feeding applications in mines, quarries and allied industries BUY UNIVERSAL. See your UNIVERSAL distributor. Write for Bulletin U536.

UNIVERSAL ENGINEERING CORPORATION
633 C Avenue N.W., Cedar Rapids, Iowa
Division of Pettibone Mulliken Corporation, Chicago



NEW Half tooth design manganese steel sprocket with chain engaging alternate teeth with each shaft revolution. DOUBLES TOOTH LIFE.



NEW Reinforced T-SECTION WELDED TO BOTTOM AND AGAINST CHAIN for greater flight strength and rigidity. Manganese steel bushings and 1⅛" case hardened steel pins for longer chain life.

PMCO
HAMMERMILL
HAISS
UNIVERSAL

IN PITTSBURGH'S GOLDEN TRIANGLE . . .

34,200 Tons of Steel Frame Construction by AMERICAN BRIDGE in 24 months!

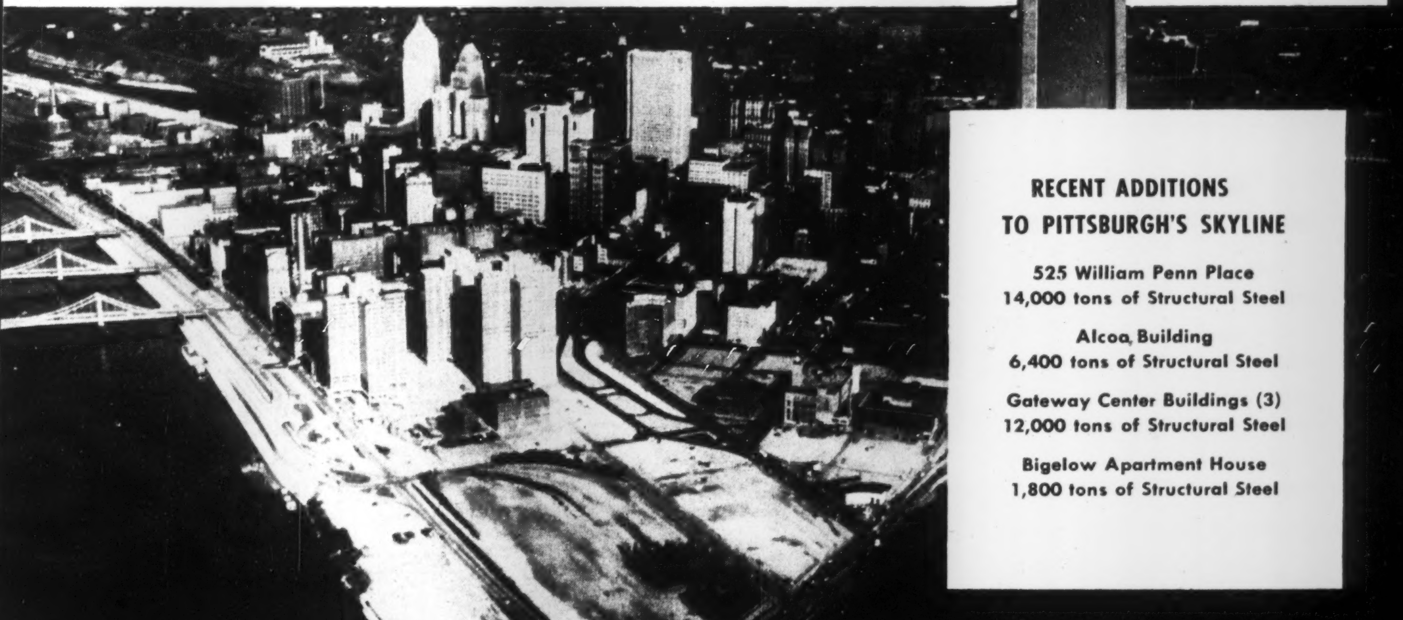
PITTSBURGH'S new buildings have been the talk of the business world. Few cities anywhere have experienced as much commercial construction in so short a time.

For example, in the famous Golden Triangle, busy hub of this hustling metropolis, American Bridge alone erected 34,200 tons of steel framework for six towering new buildings in the two year period between April 3, 1950 and March 31, 1952.

American Bridge fabricated and erected all structural steel for the 41-story building known as 525 William Penn Place; the 31-story Alcoa building; the three Gateway Center buildings (one of which is 24-stories, and two 20-stories); and the 20-story Bigelow Apartment House.

Such an accomplishment is unusual only in the fact that all buildings are located in the downtown area of a single city . . . and that all were under construction at practically the same time. The interesting point is that one company had the facilities, the skilled manpower, and the engineering know-how to handle six sizable jobs like these with such speed and efficiency without disrupting the time schedule of the numerous other construction projects which it was handling in other parts of the country.

It only goes to prove that no job is too large for American Bridge. If you would like to know more about the advantages of American Bridge fabricated and erected construction, call our nearest office.



RECENT ADDITIONS TO PITTSBURGH'S SKYLINE

525 William Penn Place
14,000 tons of Structural Steel

Alcoa Building
6,400 tons of Structural Steel

Gateway Center Buildings (3)
12,000 tons of Structural Steel

Bigelow Apartment House
1,800 tons of Structural Steel

AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: 525 WILLIAM PENN PLACE, PITTSBURGH, PA.
Contracting Offices in: AMBRIDGE · ATLANTA · BALTIMORE · BIRMINGHAM · BOSTON
CHICAGO · CINCINNATI · CLEVELAND · DALLAS · DENVER · DETROIT · DULUTH · ELMIRA
GARY · MEMPHIS · MINNEAPOLIS · NEW YORK · PHILADELPHIA · PITTSBURGH
PORTLAND, ORE. · ROANOKE · ST. LOUIS · SAN FRANCISCO · TRENTON
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

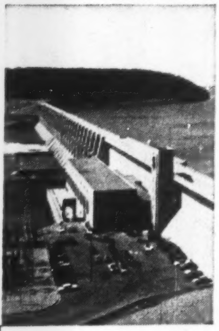
AVAILABLE NOW! *For showing in churches, schools, clubs and industries, the new sound and color motion picture— BUILDING FOR THE NATIONS — a candid, factual photographic record of the highlights of the fabrication and erection of the United Nations Secretariat Building.* For free bookings, write Pittsburgh office.

AMERICAN BRIDGE

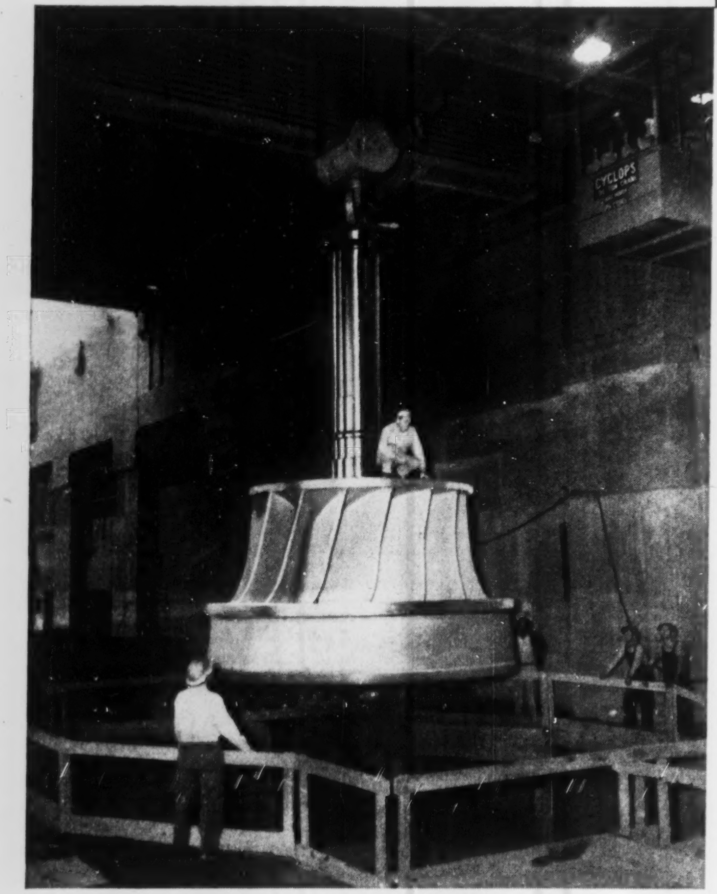
USS

UNITED STATES STEEL

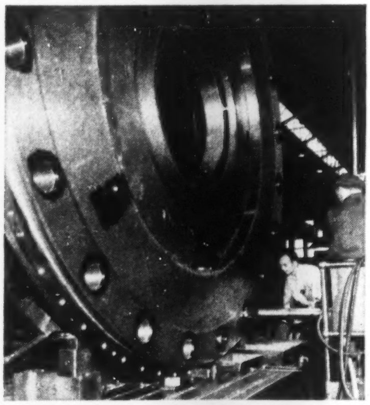
FOUR 17,000 HORSEPOWER BALDWIN FRANCIS TYPE TURBINES INSTALLED AT FORT GIBSON



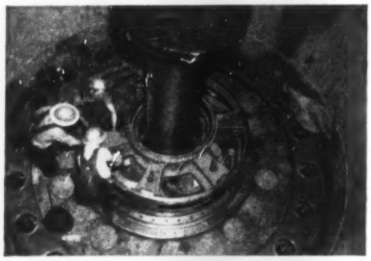
FORT GIBSON DAM—This view shows (center of photo) the powerhouse in which these turbines are installed.



BALDWIN FRANCIS TYPE TURBINE RUNNER AND SHAFT shown above being lowered into position at Fort Gibson. The total weight of these two parts is 110,400 pounds.

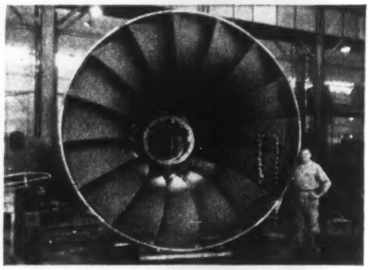


TURBINE MANUFACTURING requires lots of big, precise machine tools to handle the machining of large head covers such as the ones used at Fort Gibson.



THE HEAD COVER, MAIN BEARING AND MAIN SHAFT are shown in the above photo. The workers are busy positioning the guide bearing.

One of the foremost in the design and manufacturing of hydraulic turbines for over 100 years, Baldwin-Lima-Hamilton, together with its subsidiary, the Pelton Water Wheel Company, is among the few firms in the country with the facilities and experience required to produce such important equipment.



DISCHARGE END OF THE RUNNER is shown in this shop view prior to being shipped to the powerhouse site.

BALDWIN-LIMA-HAMILTON

Philadelphia 42, Pa. • Offices in Principal Cities

Where can I get down to earth dope on strength and thermal properties of lightweight concrete?

Ask DEWEY and ALMY for DAREX AEA Bulletin No. 9

What type of lightweight concrete should be used to meet strength and thermal specifications? For authoritative answers to this and many other questions concerning lightweight concrete, write for your *free* copy of DAREX AEA Bulletin No. 9.

This fact-filled bulletin is one of the latest additions to an extensive technical library built up through years of "Shirtsleeves" research in Dewey and Almy's cement and concrete laboratory — one of the best-equipped in the country.

Our engineers will be glad to answer any question you may have about our air entraining agents or any other product of Dewey and Almy research.

DAREX AEA • World's most widely used brand of air entraining agent. Concrete made with DAREX AEA places easier, finishes faster and better, has finer surface texture, is many times more durable when exposed to freezing and thawing.

AIRALON • A ready-to-use air entraining agent and plasticizer that contains all the ingredients necessary to make a superior masonry cement.

DARASEAL • Creates a "membrane" film which keeps water in newly poured concrete for better, more complete curing.

GRINDING AIDS • Catalyzing grinding aids for cement mills that increase grinding rates 15 to 50%, depending upon the type of cement.

DARACONE • Long-lived silicone water repellent for above grade exterior masonry walls. Effectively combats efflorescence and leaks without affecting the appearance or "breathing" qualities of the masonry. Easy to apply.

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DEWEY and ALMY Chemical Company
Cambridge 40, Mass.

Offices or Subsidiaries in Buenos Aires, Copenhagen, London, Melbourne, Milan, Montevideo, Montreal, Naples, Paris, Saõ Paulo, Tokyo.

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Cambridge 40, Mass.
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City.. State..............................

MM WHEELERS
• Equipped for your job • easy to handle • high speed • large capacity • durable single unit construction • low in cost • nearby parts and service
POWER! That's what you get with this MM loader unit—big-capacity lifting plus real power down-crowding performance.

MINNEAPOLIS-MOLINE
MM
MODERN MACHINERY
WHEELERS

COST LESS TO OWN . . . LESS TO OPERATE . . .
and, they're HEAVY DUTY . . . ALL THE WAY!

You get ALL the benefits of Modern Manufacture when you specify MM Wheelers. Standardized, heavy duty parts and modern assembly procedures cost you less to begin with. Quality control in parts and assembly offers maximum precision for longer service on the job. And, those same efficient production methods permit special MM design features that give *better* loading performance—*greater* loading capacity.

Every day, more and more careful buyers are getting the facts from MM distributors . . . *buying* MM Wheelers for lower *first* cost—lower *operating* costs.

TALK ABOUT CAPACITY! Here's an MM loader unit handling a log 45" thick, 18' long, weighing 11,000 lbs.

MINNEAPOLIS-MOLINE
MINNEAPOLIS 1, MINNESOTA

READER COMMENT

near Ulm, described by Fritz Leonhardt and Curzon Dobell in ENR Sept. 3, p. 43, is interesting, of course, but the interest is purely academic because of the vastly different labor and material costs abroad as compared with those obtaining here. A sober study of these differences might tend to temper the enthusiasm of some of our designers.

F. H. Frankland
Frankland and Lienhard
New York, N. Y.

Bigger than biggest

Sir: In ENR July 16, p. 56, you show "Biggest Timber Roof." We built a job quite a bit larger than this, away back in 1942. H. J. Brunier, of San Francisco, was the structural engineer. The general contractor was a joint venture of Carl N. Swenson and Earl Heple, both of San Jose, Calif. The job was the Reconsignment Depot at Lathrop, Calif.

	"Biggest Timber Roof"	Lathrop Depot
No. of Trusses	773	1,551
Span—Ft	71	60
Area—Acres	28	49.6
Time—Months	9	4

We never made the claim that our job was "the world's largest," since claims like this usually bring forth a flood of other boasts. Why don't you run a contest to see just who did build the world's largest? This can be our entry.

E. R. Taylor
Taylor Roof Structures
Oakland 7, Calif.

Contract details

Sir: In the July 30 issue, p. 34 of Engineering News-Record, there is the statement that ". . . . at Paulo Afonso Falls, M-K is constructing a $55-million power plant and 150 miles of transmission line".

The Paulo Afonso plant was designed and is being built by the Companhia Hidro Electrica do S. Francisco". The project and all the engineering work developed in the construction of that power plant from 1948 up to now was done and is being done by the Technical Directorate of this Company (Companhia Hidro Electrica do S. Francisco), whose director is the Brazilian Engineer Octavia Maroondes Ferraz.

We have made a contract with Morrison Knudsen for the construction of the transmission lines from Paulo Afonso to Salvador and to Recife, covering a total length of 535 miles.

The erection of the above mentioned transmission lines is now complete and we have also contracted the service of M-K for the construction of the Recife, Salvador, Angelim and Itabaiana sub stations. The design of these substations and of the above transmission lines was done also by the Technical Directorate of the Companhia Hidro Electrica do S. Francisco and all material and equipment necessary for these lines and substations were selected and purchased by this company.

Antonio Jose Alives de Souza
President
Companhia Hidro Electrica do S. Francisco

CALENDAR

Structural Engineers Association of California, The Ahwahnee, Yosemite National Park, Oct. 8-10.

National Conference of Industrial Hydraulics, Hotel Sheraton, Chicago, Oct. 8-9.

American Concrete Pressure Pipe Association, convention and meeting, Ponte Vedra Inn, Ponte Vedra, Fla., Oct. 8-10.

Concrete Reinforcing Steel Institute, semi-annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., Oct. 12-17.

Federation of Sewage and Industrial Wastes Associations, Municipal Auditorium, Miami, Fla., Oct. 13-16.

National Reclamation Association, Mapes Hotel, Reno, Nev., Oct. 14-16.

Engineers Council for Professional Development, Hotel Statler, New York City, Oct. 14-17.

American Society of Civil Engineers, annual meeting, Hotel Statler, New York City, Oct. 19-23.

Construction Section, National Safety Council, Safety Congress, Hamilton Hotel, Chicago, Oct. 20-22.

Society of American Military Engineers, semi-annual convention, George Washington Hotel, Jacksonville, Fla., Oct. 25-26.

American Public Works Association, annual public works congress and equipment show, Roosevelt Hotel and Municipal Auditorium, New Orleans, La., Oct. 26-29.

California Section, American Water Works Association, Palace Hotel, San Francisco, Calif., Oct. 27-30.

American Concrete Institute, Southwestern regional meeting, Rice Hotel, Houston, Tex., Oct. 29-30.

National Council of State Boards of Engineering Examiners, annual meeting, Plaza Hotel, San Antonio, Tex., Oct. 29-31.

Fourth annual conference on coastal engineering, Council for Wave Research, Del Prado Hotel, Chicago, Ill., Oct. 29-31.

Illinois Traffic Engineering Conference, University of Illinois campus, Urbana, Ill., Nov. 3-4.

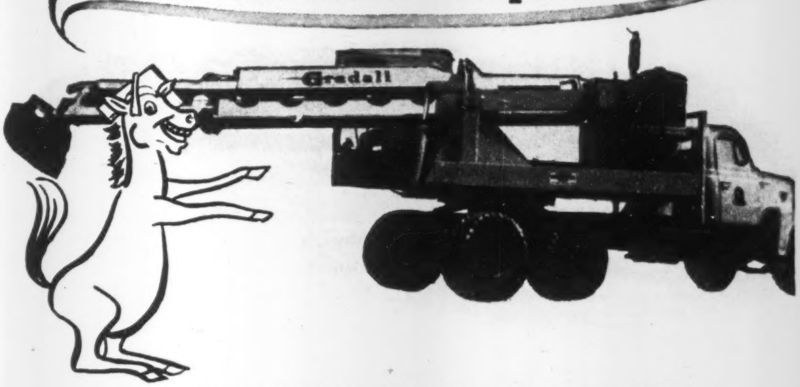
American Association of State Highway Officials, annual meeting, Wm. Penn Hotel, Pittsburgh, Pa., Nov. 10-13.

Conference on porcelain enamel in the building industry, National Academy of Sciences, Washington, D. C., Nov. 12-13.

Highway and Surveying conference, University of Florida, Gainesville, Nov. 19-20.

American Institute of Steel Construction, annual convention, Boca Raton Hotel, Boca Raton, Fla., Nov. 30-Dec. 4.

Let's Talk Horse Sense about Horsepower

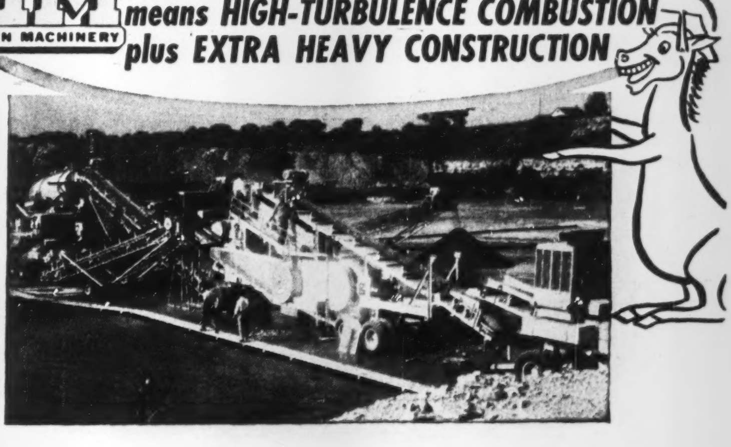


IT TAKES MORE THAN HORSEPOWER TO GIVE YOU PRODUCTION POWER

To handle rated load capacity for long and extended periods takes more than horsepower. It takes high torque developed at moderate speeds by a heavy-duty industrial engine. Minneapolis-Moline industrial engines are especially designed and built to stand continuous heavy load operation because they develop *more torque* at *normal* operating speeds.

MM MINNEAPOLIS MOLINE MODERN MACHINERY

HEAVY DUTY POWER
means HIGH-TURBULENCE COMBUSTION plus EXTRA HEAVY CONSTRUCTION



Compare the extra weight and extra strength of MM Engines. Note the large, sturdy crankshaft with its husky cheeks and throws . . . the larger bearings which reduce combustion pressures . . . the extra crankcase depth below the center line of the crankshaft. Examine all these factors in terms of overall performance and longer engine life, and you'll see there's real horse sense in every part of MM heavy-duty design.

Let's talk horse sense about value, too. MM puts heavy-duty horsepower on the high production line to give you dependable, long-lasting engines for less.

Get the facts today on front or rear power take-off and choice of rotation as well as PTO speeds that meet your needs and save you money.

MINNEAPOLIS-MOLINE
MINNEAPOLIS 1, MINNESOTA

TRAILMOBILE trailers can help speed a TIGHT CONSTRUCTION SCHEDULE!

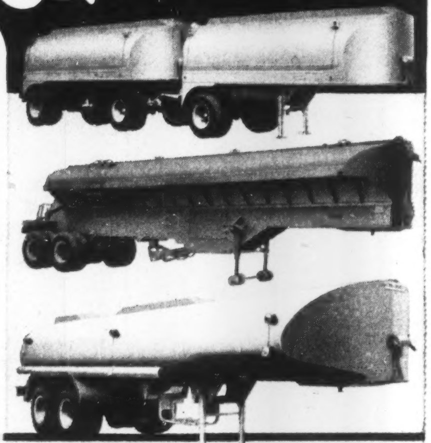
USE THIS TRAILMOBILE CHECK LIST

- ☐ Water
- ☐ Gasoline
- ☐ Kerosene
- ☐ Asphalt
- ☐ Bulk Cement
- ☐ Aggregate
- ☐ L.P. Gas

Trailmobile can provide any of the following tank trailers—for water, gasoline, oil, butane and kerosene in specific sizes.

This 115-barrel bulk cement trailer can be emptied in 15 minutes with positive step-down screw discharge unloading—saves packaging and handling of bags.

Asphalt trailers, with or without heating units—to legal capacity.

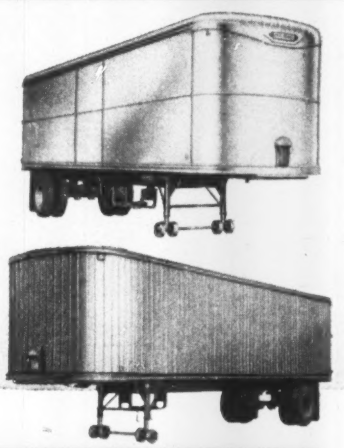


- ☐ Steel Beams
- ☐ Piping
- ☐ Bulk Machinery
- ☐ Concentrated Weights and Loads
- ☐ Lumber

Trailmobile flat beds are available in almost any length and capacity, for on-and-off highway use. Famous Trailmobile Tandem suspension makes them "easy" rolling and long lasting.

- ☐ Miscellaneous Equipment
- ☐ Loose Freight and Cargo
- ☐ Electrical Equipment
- ☐ Explosives and Delicate Instruments
- ☐ Tools
- ☐ Mobile Field Office

Available in either steel or aluminum, single or tandem axles—and in sizes from 18′ to 42′. All new Trailmobile designs are Electronically Tested. Units are designed for minimum maintenance and long, hard service. These Trailmobile vans can handle all your bulk and miscellaneous equipment.



Check the yellow pages of your phone book for the name and address of the nearest Trailmobile Branch Office or wire or write Trailmobile Inc.

All types, sizes and kinds of used trailers available for prompt delivery.

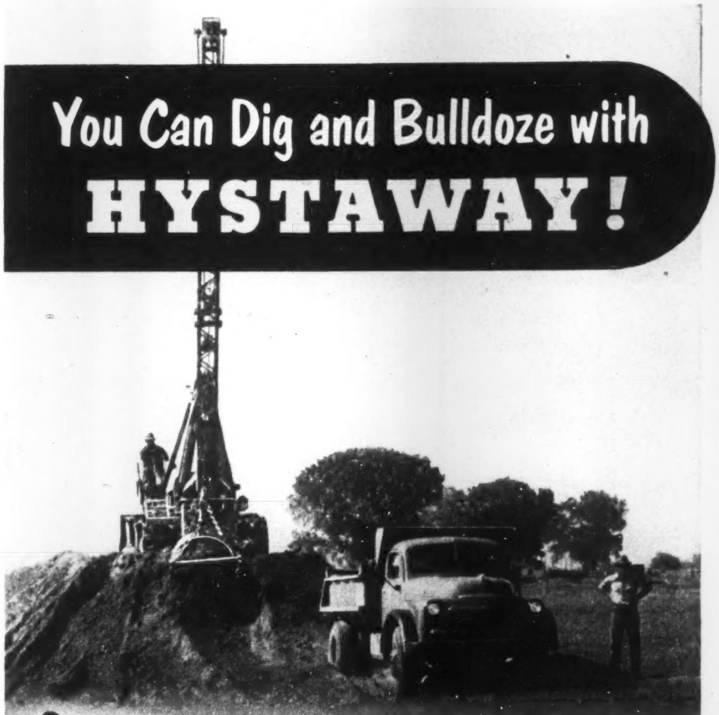
The Trend is to **TRAILMOBILE**

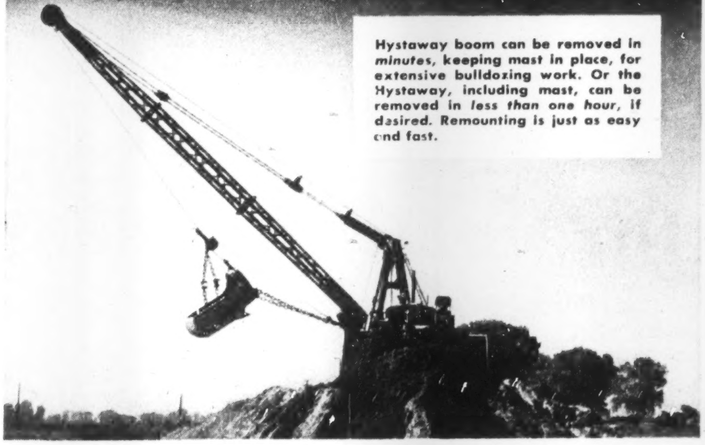
TRAILMOBILE INC.

CINCINNATI 9, OHIO BERKELEY 10, CALIFORNIA

Friendly Sales and Service from Coast to Coast

You Can Dig and Bulldoze with HYSTAWAY!





Hystaway boom can be removed in *minutes*, keeping mast in place, for extensive bulldozing work. Or the Hystaway, including mast, can be removed in *less than one hour*, if desired. Remounting is just as easy and fast.

. . . and that means getting jobs done *faster* with less equipment

HYSTAWAY® is the *only* machine that performs excavator-crane work as well as bulldozing and other tractor service. The *only* excavating machine that keeps productive *all* the time. Because when HYSTAWAY isn't digging, it can backfill or do other bulldozing jobs by simply turning around and using the bulldozer. For extensive bulldozing, or other tractor work, the Hystaway can be removed from the tractor in a matter of minutes. It can then be remounted, when needed, in a short time. This means you get *more* out of your equipment investment; more profit from every working hour.

Other important Hystaway advantages: No tail swing, permitting digging against fences, walls and in other close quarters; heavy-duty diesel tractor engine power for faster digging; crawler tractor mobility and maneuverability. Hystaway can be mounted on new or *used* Caterpillar track-type tractors. Hystaways are in service all over the world. There is no other *machine like Hystaway!* Get full details from your Caterpillar-Hyster Dealer or write for Catalog 1235 to:

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Peoria 1, Illinois

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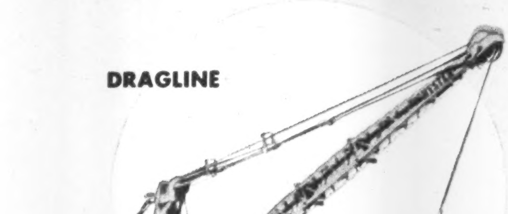
THERE'S PROFIT IN
HYSTER
POWER

ONLY HYSTAWAY OFFERS ALL THESE MACHINES IN ONE!



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4. CLAMSHELL
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6. PILE DRIVER
7. PLUS BULLDOZER

PLUS
BULLDOZER

HYSTER COMPANY • PORTLAND, OREGON; PEORIA, ILLINOIS; NIJMEGEN, THE NETHERLANDS

NEW YORK CENTRAL SYSTEM
PLYMOUTH
V.C.RY.
500

21 Years Old

—yet it costs only 1/3 as much for maintenance!

Read these startling facts!

Five years ago the Virginia Central Railway of Fredericksburg, Virginia, bought a 16-year-old locomotive from the U. S. Army Proving Ground at Aberdeen, Maryland. Now at the ripe age of 21 years, this worthy Plymouth requires routine maintenance only and this maintenance costs only one-third as much as for the locomotive which it replaced!

Commenting on this Plymouth, George D. Williams, President, says, "It's an excellent locomotive and will pull with ease all the loads we have to move. Maintenance costs for the Plymouth figure out to only 14¢ per car, whereas our former locomotive cost us 42¢ per car."—In the face of rising costs generally, this reduction over the past five years is truly remarkable!

Remarkable as it is, a new Plymouth Locomotive with Torqomotive Drive* can reduce costs still further. Write for complete information on new 3 to 70 ton Plymouths. Narrow or standard gauge—gasoline and Diesel-mechanical, gasoline and Diesel Torqomotive, or Diesel-Electric Drive.

PLYMOUTH LOCOMOTIVE WORKS
Dept. A-4, Plymouth, Ohio

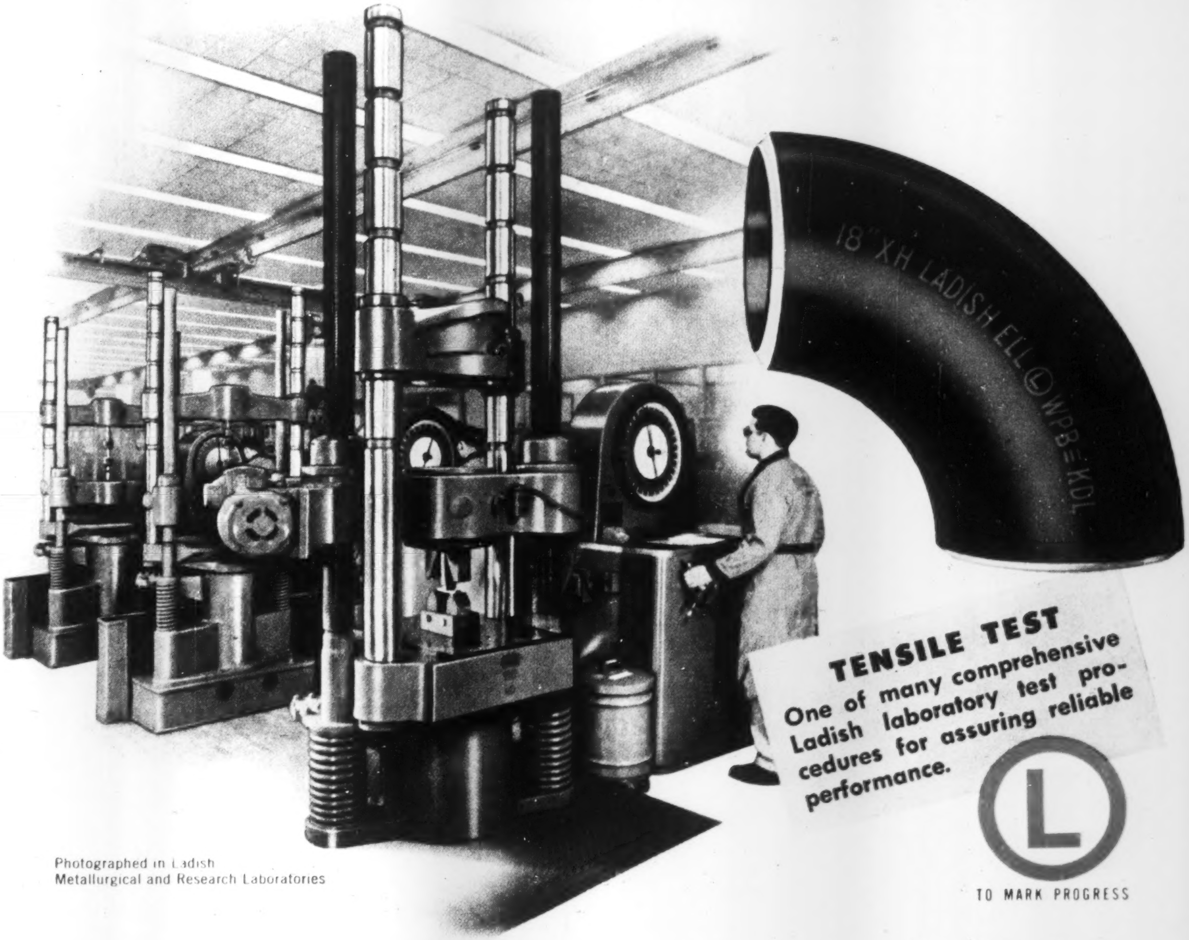
* Torqomotive Drive: Plymouth transmission with hydraulic torque-converter.

PLYMOUTH LOCOMOTIVES

WITH TORQOMOTIVE DRIVE

ALSO MANUFACTURERS OF F-R-H CERAMIC MACHINERY

LADISH *Controlled Quality* ASSURES METALLURGICAL SOUNDNESS



TENSILE TEST
One of many comprehensive Ladish laboratory test procedures for assuring reliable performance.

TO MARK PROGRESS

Photographed in Ladish
Metallurgical and Research Laboratories

Testing the breaking point of metal... proves Ladish fittings have ample strength to meet the test of maximum service

Optimum strength — proved by scientific test — typifies the outstanding values in Ladish fittings that result from special emphasis on sound metallurgy and advanced facilities. Shown here is modern Universal tensile testing equipment on which ultimate strength, yield strength, reduction of area and elastic properties are carefully measured to assure users of Ladish Controlled Quality fittings the metal quality essential for reliable performance.

THE COMPLETE *Controlled Quality* FITTINGS LINE
PRODUCED UNDER ONE ROOF . . . ONE RESPONSIBILITY

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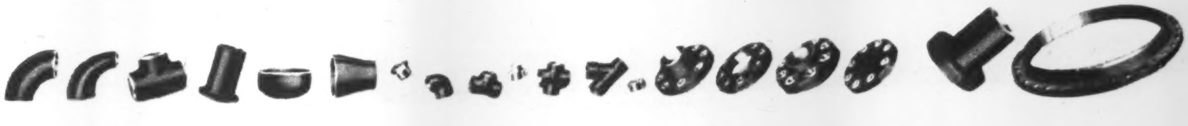


10-Speed TERRA COBRAS highball 3,700,000-yard job in North Carolina

SAYS PROJECT MANAGER R. M. WALTON:

"...used Cobras on previous 10-month job...found them rugged and easy to maintain...was pleased to recommend purchase of six new Cobras"

SUPERINTENDENT W. R. JONES SAYS:

"Being responsible for production...I'm glad we bought Terra Cobras. They make more loads ...and do it day after day"

Grannis & Sloan, top flight Southern earthmoving contractors, recently tackled the big military site preparation job at Ft. Bragg, N.C. It's natural that they put six new Terra Cobras in their spread, having just completed a previous 1,500,000-yard job with a Cobra fleet. They knew they could depend on Cobras to keep dirt moving on a tight schedule.

With the ten speeds available, the new Cobras at Ft. Bragg are handling a much wider range of work, shaving valuable time off every cycle. Typical variable conditions make full use of all the 10-speed transmission advantages—the complete range of ten gear steps necessary for balanced power and top efficiency in muddy pits and tough going, or at speeds to 35 mph on long cycles and good haul roads. The Terra Cobra is the only two wheel tractor scraper with this 10-speed versatility to help you bid successfully and clean up more profits on more types of jobs. Get full details before you buy.

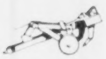
WOOLDRIDGE

WOOLDRIDGE MANUFACTURING COMPANY
Sunnyvale, California, U.S.A.

Terra Cobra

Terra Cobra Wagon

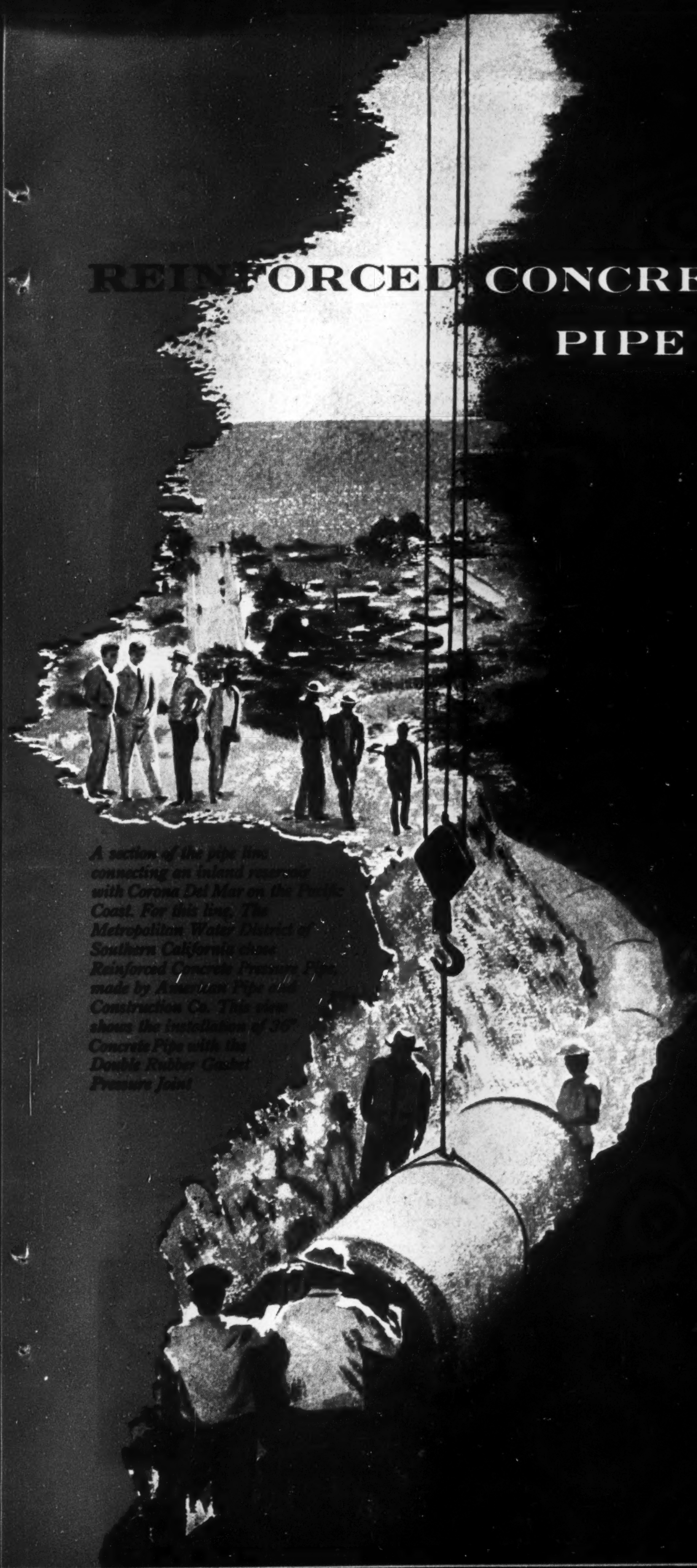
Scrapers



Rippers

Cable Control Units

Bulldozers



A section of the pipe line connecting an inland reservoir with Corona Del Mar on the Pacific Coast. For this line, The Metropolitan Water District of Southern California chose Reinforced Concrete Pressure Pipe, made by American Pipe and Construction Co. This view shows the installation of 36" Concrete Pipe with the Double Rubber Gasket Pressure Joint

From inland reservoir to rugged coast line…

REINFORCED CONCRETE PRESSURE PIPE SAVES MONEY ALL THE WAY!

This installation, near Corona Del Mar, California, is only one of thousands where Reinforced Concrete Pressure Pipe has helped to cut over-all costs.

Steel…fully protected by densely compacted concrete…provides the necessary strength to withstand internal pressures and external loadings. It is not exposed to corrosion and the pipe is completely free from tuberculation. Smooth interior pipe walls assure consistent high carrying capacity…low pumping costs…eliminate costly cleaning and relining work…permit the use of smaller diameters. Reinforced Concrete Pipe is easy to lay and costs are kept low by using only standard contractors' equipment. Quality materials, sound workmanship, and a built-in safety factor offer you maximum satisfaction.

You'll find a class of American Reinforced Concrete Pressure Pipe to meet your needs…carefully designed, precisely engineered, and built to meet the strictest specifications. Our 50 years of experience, our informative booklets, and our sales engineers are at your service…as near as your telephone.

Phone or write for complete information.

American PIPE AND CONSTRUCTION CO.

Concrete pipe for main water supply lines, storm and sanitary sewers, subaqueous pipe lines

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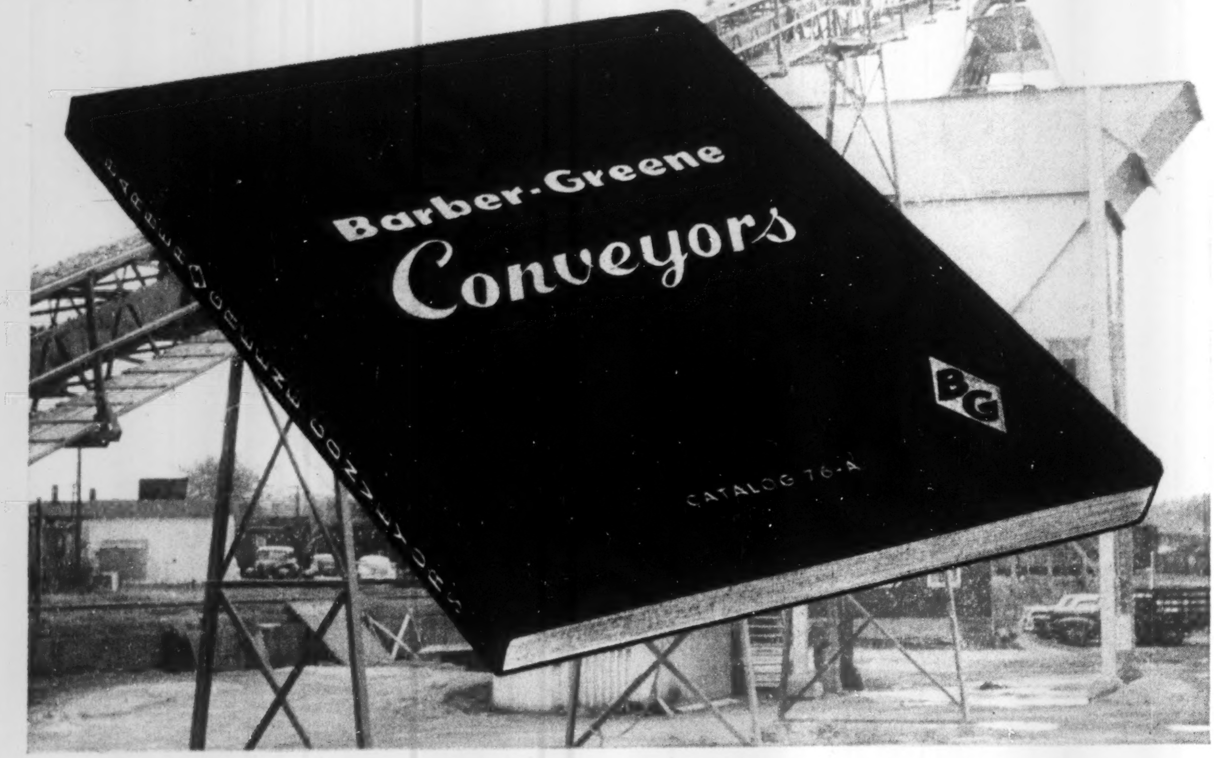

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Here's the Most Complete, Comprehensive, Easy-to-Use Conveyor Catalog Ever Published!

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This catalog clearly and factually demonstrates the savings in design, delivery time, erection and operating costs that Barber-Greene standardization makes possible. Once you use it, you'll have a new conception of the economy, utility and simplicity of Barber-Greene Standardized Conveyors.

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If you handle bulk materials, you'll want this new catalog. Please request Catalog 76-A on your company letterhead.

53-20A-PE

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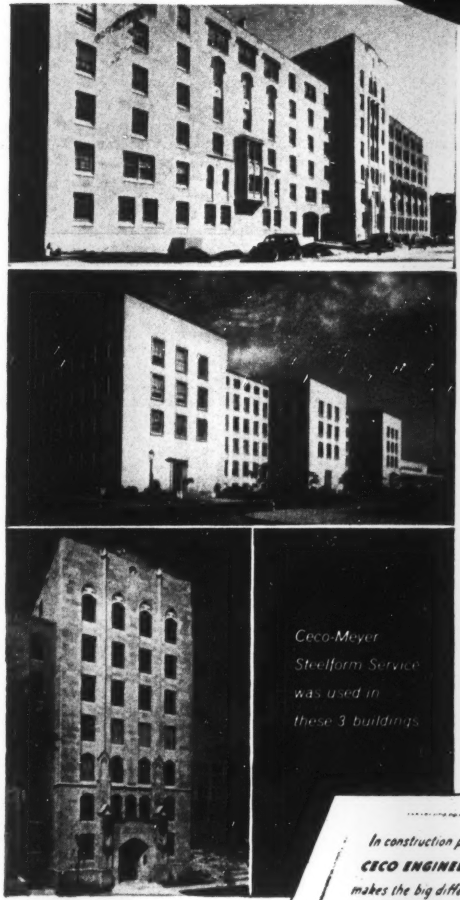
Aurora, Illinois, U. S. A.

Ceco-Meyer Steelform Service cuts costs 11% . . .

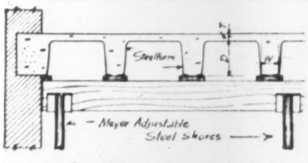


Ceco-Meyer Steelform Service was used in these 3 buildings

Economy in building is important, even to a great institution. So, when Schmidt, Garden and Erickson, Architects, designed three units of a medical center in Chicago, several methods of constructing floor systems were studied. Ceco-Meyer Steelform Service was selected because it offered definite savings. But let them tell the story.

"We made an analysis of several types of construction," say the architects, "including slab-beam-and-girder, solid slab and several others. When the figures were on paper, concrete joist construction showed a saving of 11% in the concrete frame. Ceco was selected to provide Meyer Steelform Service. J. W. Snyder Company, General Contractor, made the indicated savings realistic."

"To complete a major hospital job on time," says Constructor Victor Snyder, "there must be close cooperation between architect, constructor and a supplier who understands our joint problems. Such a firm is Ceco . . . their construction knowledge in the field, and ability to perform, got them the job."



cross section *Less steel, concrete, lumber, labor with Ceco-Meyer Steelform Service.*

CECO PRE-PLANNING CONSULTATION SERVICE
Ceco Product and Design Specialists will assist you in the application of Ceco building products at the pre-planning stage . . . Call Ceco office for overnight service.

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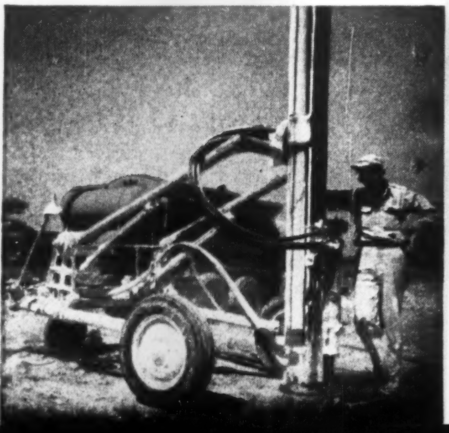
MORE AIR POWER! MORE FOOTAGE! MORE PROFITS!

Le Roi-CLEVELAND Sinkers are available in sizes from 18 to 80 lbs., with advantages you want. They use less air. They're easy to handle—operators don't tire easily. And they have what it takes to drill more feet per shift: Strong rotation. Powerful blow. High drilling speed.

Tractair is a combination 35-hp tractor and 105-cfm compressor that takes air power anywhere. Here, it operates two Le Roi-CLEVELAND backfill tampers. Can also be used for breaking, drilling — and, when equipped with front-end loader, for digging, loading, lifting, backfilling, snow-plowing, etc. This way, Tractair cuts costs and saves you the extra expense of special equipment.

Le Roi-CLEVELAND DR30 Wagon Drill puts deep holes down faster, with less air, than any other wagon drill available. Uses 4" bore Le Roi-CLEVELAND Drifter. Has strong rotation, powerful hole-cleaning ability, and high drilling speed with big bits. For shallow holes, the lightweight Le Roi-CLEVELAND DR34 is available.



Get air jobs done faster!

with Le Roi Airmaster Compressors *and* Le Roi-CLEVELAND Air Tools

There are 9 sizes of Airmasters — and 14 models—ranging from 60 cfm to 600 cfm. A 600-cfm diesel unit is shown here. It's got the capacity to operate two deep-hole wagon drills with plenty of air to spare for other tools.

Every Airmaster is powered by a heavy-duty Le Roi engine designed especially for compressor service.

Le Roi-CLEVELAND Paving Breakers are available in sizes from 18 to 80 lbs. They really pack a wallop—make short work of breaking up the hardest concrete. Protective air cushion in front end assures long life. Well balanced for easy handling. Operators like them — and get more done.

YOU make the most of air power—speed your work and keep costs down — when you team up Le Roi Airmaster Compressors and Le Roi-CLEVELAND Air Tools. Here's why:

First of all, a Le Roi Airmaster gives you more air capacity for less money. You can get an Airmaster that's *exactly right* for size — one that's not too big or too little for the job to be done — one that lets you do the most work at the least cost. That's because Le Roi has the industry's widest range of sizes to choose from.

You're ahead other ways, too: Airmaster's full-pressure system delivers *all* the air you call for, *when* you call for it. Conservative rating of the Airmaster engine provides ample power reserve — for lower fuel consumption, less maintenance, lower operating costs. Magneto ignition gives you quick, easy starting — saves time — lets you get going faster.

Now, the best way to use the low-cost air produced by Airmaster is to let it power Le Roi-CLEVELAND Air Tools. They're built to really take punishment — and to break more pavement, dig more clay, drill more rock, tamp more fill.

Enjoy Le Roi air-power advantages. Use Le Roi Airmaster and Le Roi-CLEVELAND Air Tools on your next job — and watch costs drop. See your Le Roi distributor. Write for latest bulletins.

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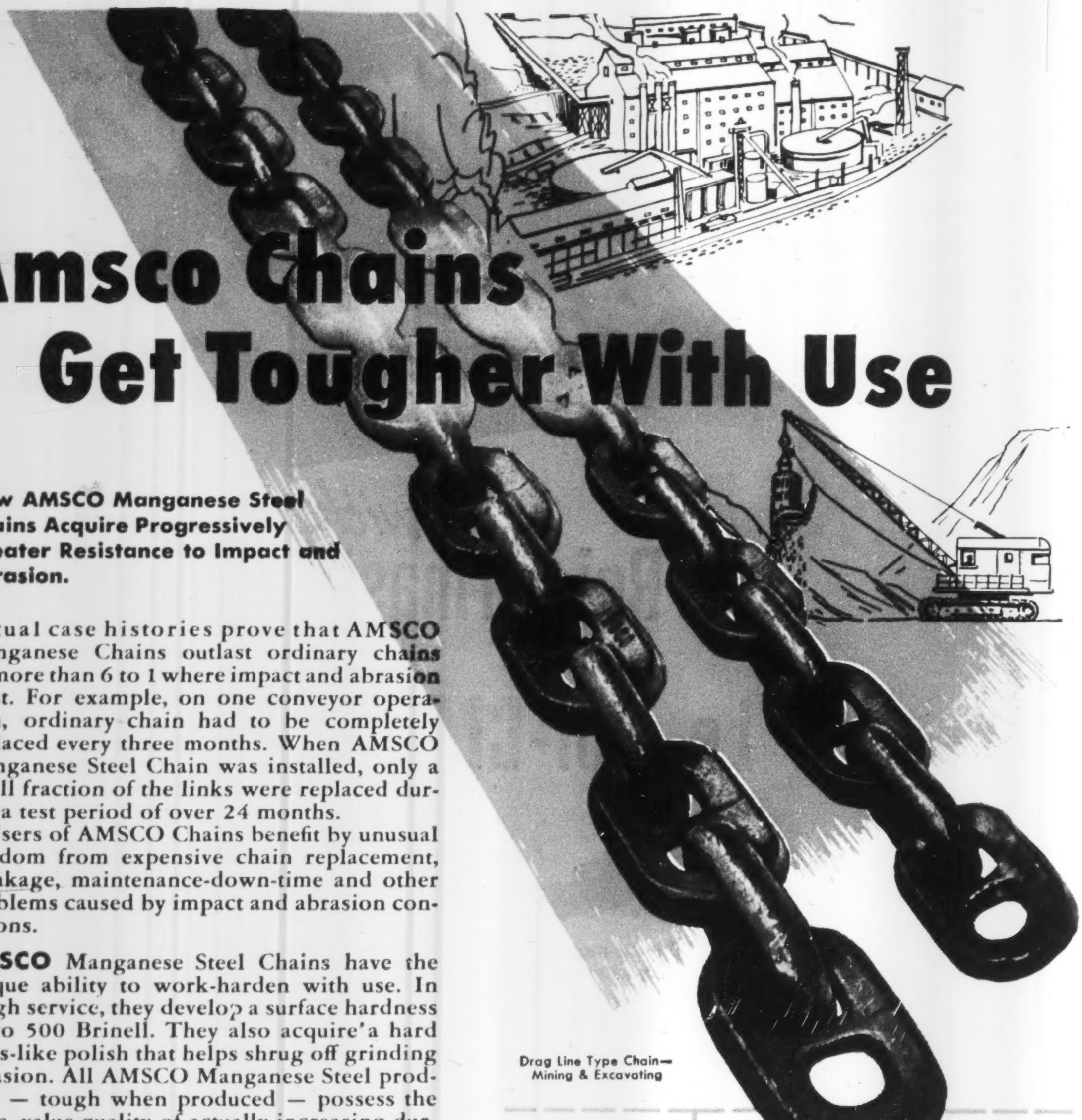
Amsco Chains Get Tougher With Use



Drag Line Type Chain—Mining & Excavating

How AMSCO Manganese Steel Chains Acquire Progressively Greater Resistance to Impact and Abrasion.

Actual case histories prove that AMSCO Manganese Chains outlast ordinary chains by more than 6 to 1 where impact and abrasion exist. For example, on one conveyor operation, ordinary chain had to be completely replaced every three months. When AMSCO Manganese Steel Chain was installed, only a small fraction of the links were replaced during a test period of over 24 months.

Users of AMSCO Chains benefit by unusual freedom from expensive chain replacement, breakage, maintenance-down-time and other problems caused by impact and abrasion conditions.

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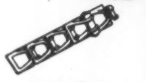
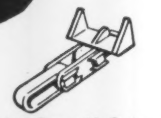
AMSCO Chains are made of Manganese Steel —the "Toughest Steel Known." They are produced in many standard and special shapes by American Manganese Steel Division—largest producer of manganese steel for all industry.

If you use chain, and desire a more durable alloy, you are invited to contact AMSCO. There's a good chance we can save you money and provide chains that will outlast your service life expectations.

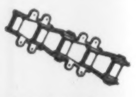
AMSCO Chain Assumes Many Forms To Serve Industry. A Few Are:



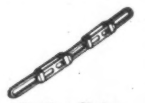
Detachable Chain—Bucket Elevating



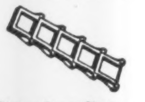
Pinlock Type with Cast-on Dog—Log Hauling



840 Series Chain—Bucket Elevating



Rivetless Chain—Mining



Clinker Drag Chain—Cement Milling

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AMERICAN MANGANESE STEEL DIVISION
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AMERICAN DOUBLE-X Mechanical Joint Pipe

The above illustration shows an outfall sewer line at Dunedin, Florida, which was constructed of 20″ American Double-X mechanical joint pipe. It extends about one quarter mile into St. Joseph Sound for disposal of the effluent from the sewage disposal plant. The assembled pipe line was floated out from shore with a bulldozer supplying the thrust at the shore end.

Manufactured under rigid specifications in diameters 3″ through 48″, American Double-X pipe will stand the impact of heavy loads and gives complete job satisfaction. American Double-X pipe is conveying water, gas, crude oil, gasoline, sour naphtha, sewage, salt brine —and in fact, just about everything that a pipe line can conceivably convey. It is conveying these products under operating pressures ranging from a few pounds to the square inch, up to pressures in excess of 100 pounds gas and 500 pounds liquid.

A complete line of fittings for use with American Double-X pipe is available including transition pieces for interconnecting with other types of joints and pipe.

Write for American Double-X pipe booklet. A free copy will be sent on request.

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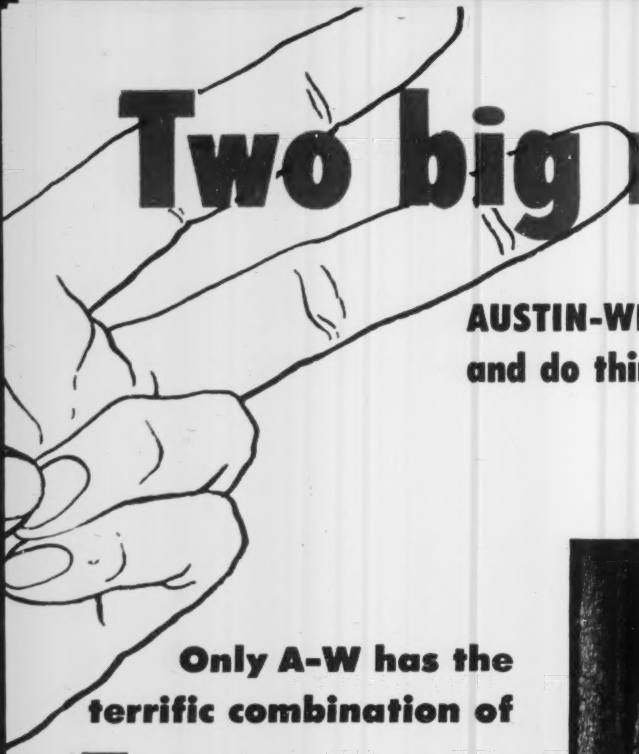

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AUSTIN-WESTERN power graders go places and do things no other graders can match

Only A-W has the terrific combination of

1 ALL-WHEEL DRIVE

plus

2 ALL-WHEEL STEER

Modern logging methods require good roads. And today more and more access roads are being built and maintained in the tough timber country with Austin-Western Power Graders—"The Graders That Have Everything".

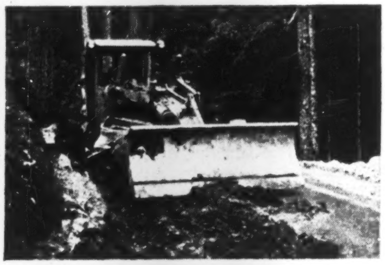
"All-Wheel Drive". . . puts every ounce of engine power on a driving, climbing wheel. Top traction puts extra power where it's needed—at the blade.

"All-Wheel Steer". . . takes the grader where it's wanted in the shortest time; holds every wheel where the footing is best.

Yes, the Austin-Western Power Grader has plenty of what it takes to carve new roads out of sheer wilderness . . . fast, and at low cost.

Send for additional information TODAY.

An Austin-Western "99-H" Power Grader dozing slash off the shoulder preparatory to cutting a new ditch.



All-Wheel Drive and All-Wheel Steer take the Austin-Western Grader through the toughest going with ease.

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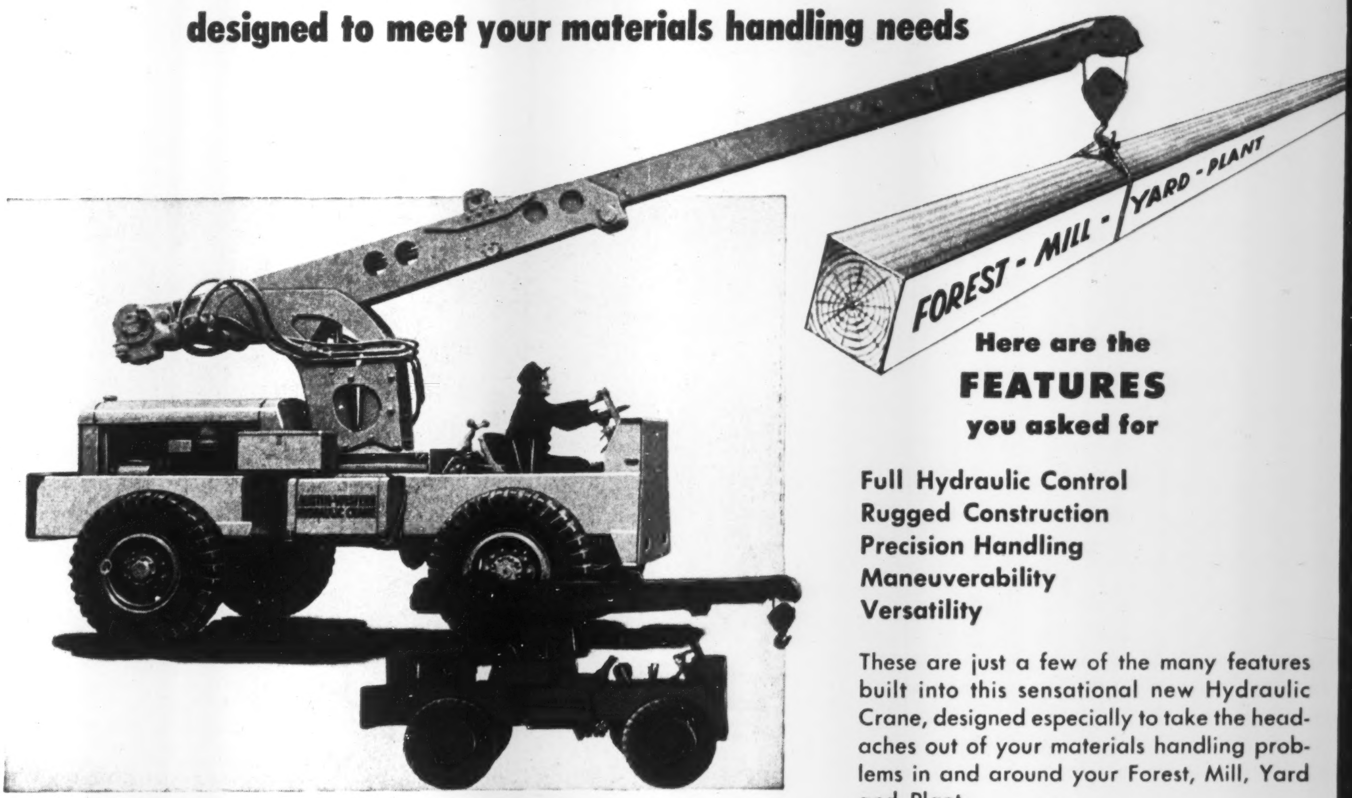
A-W tops them all!

AUSTIN-WESTERN hydraulic crane... designed to meet your materials handling needs



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FEATURES
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Full Hydraulic Control
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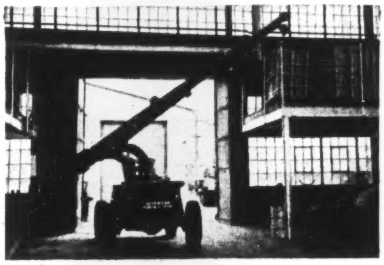
These are just a few of the many features built into this sensational new Hydraulic Crane, designed especially to take the headaches out of your materials handling problems in and around your Forest, Mill, Yard and Plant.

No other machine in your spread will do more jobs—inside and outside.

No other machine can equal the speed and low cost operation.

Here is the all-purpose "Jack-of-all-trades" crane you've been waiting for, and, like all other Austin-Western products, it's "Built to Outperform". Get complete information NOW.



The telescopic boom can be raised from the horizontal to an approximate 45° angle and is continuously rotatable through a full 360°.

The angle of the boom is quickly and easily changed, and the Crane can lift and transport its maximum load inside and outside.

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This lightweight steel decking comes in units long enough to span three or more purlin spacings. Members are designed for full-length interlocking—a principle which increases carrying capacity as much as 25%. Long spans and full-length interlocking mean important first-cost savings in trusses and structural framing.

Lightweight Ferrobord is easy to handle, easy to place. Welding contacts are flat. Work is done from above. No need for scaffolding or movable stages during erection. More first-cost economies.

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✻ The photos below illustrate typical concrete and asphalt removal practice now being employed by hundreds of Utilities, Municipalities, Contractors and Maintenance Crews in Streets, Floors and Sidewalks. The benefits include lower maintenance costs, lower installation, repair and replacement costs.

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SAVES-

...UP TO 50% on REMOVAL TIME

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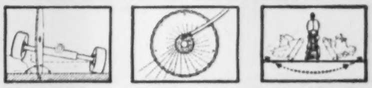
"4 OUT OF 5" BUY CLIPPER CONCRETE SAWS. Three-Point Suspension holds the blade straight and true in the cut—eliminates binding—twisting—drifting—sidewear and friction. The patented water application assures adequate coolant at all times — Increased blade life and speed. Perfect balance and Dashboard Controls for operating ease and maneuverability.

Experience Proves a Concrete Saw Must Have These Clipper Features for MAXIMUM ECONOMY



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This unqualified Clipper guarantee of satisfaction is backed by Nearly 20 Years of world-wide experience, the ability to select the finest materials and the "know-how" to put them together. ORDER TODAY... on FREE TRIAL. Discover for yourself how Clipper will increase your profits!

WORLD'S LARGEST MANUFACTURER OF MASONRY AND CONCRETE SAWS

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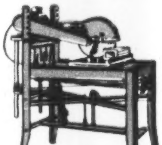
...the First and Only saw in the world that will cut every masonry material regardless of size and hardness. Clipper outperforms them all for ONLY Clipper is "CONVERTIBLE" and has the Exclusive-Patented Features for **flexibility.** A Clipper model to fit any job—any budget. Sold on FREE TRIAL... Priced from $265.



MODEL C-130—One of 5 Models—Gas or Electric Powered. From $465. up.

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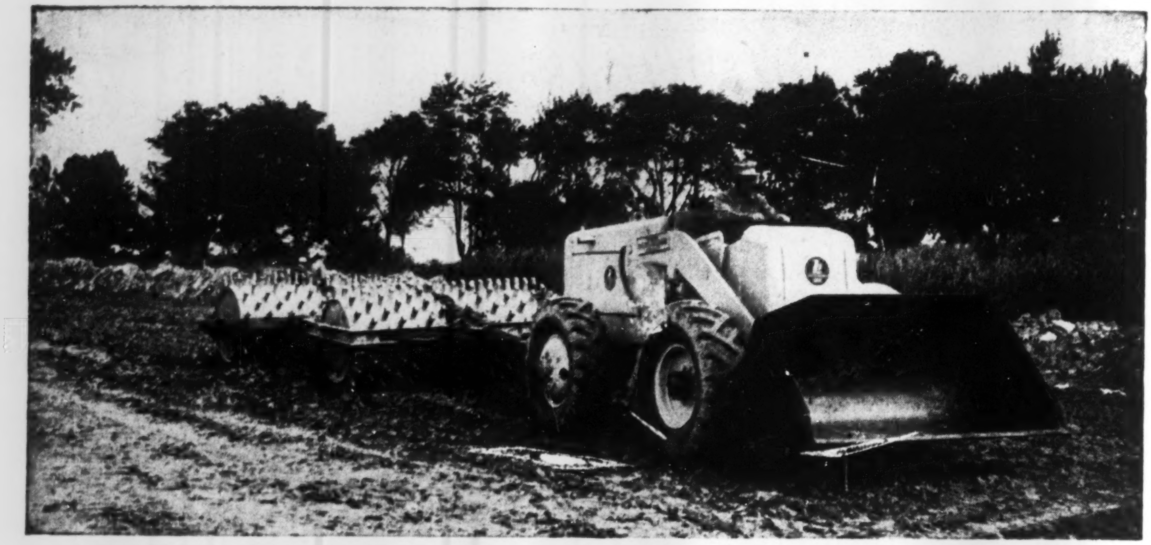
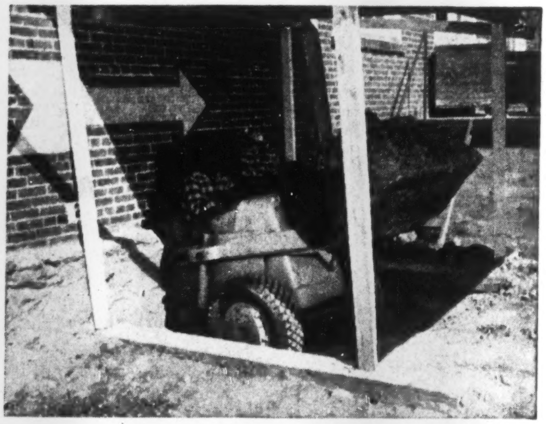
(ADVERTISING)

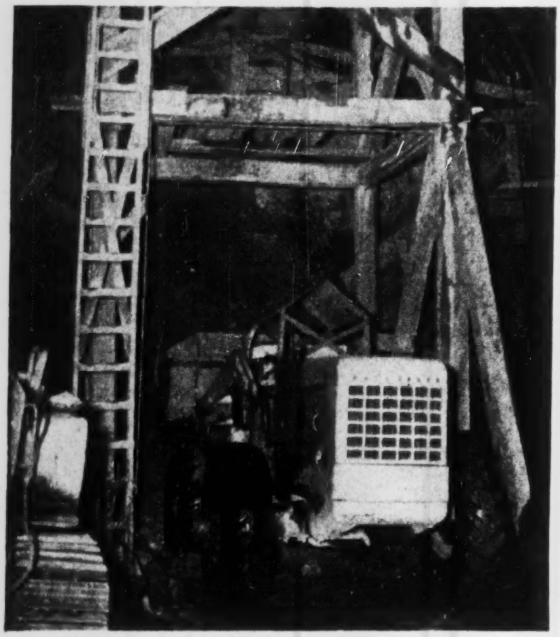
CONSTRUCTION
Pictorial Review



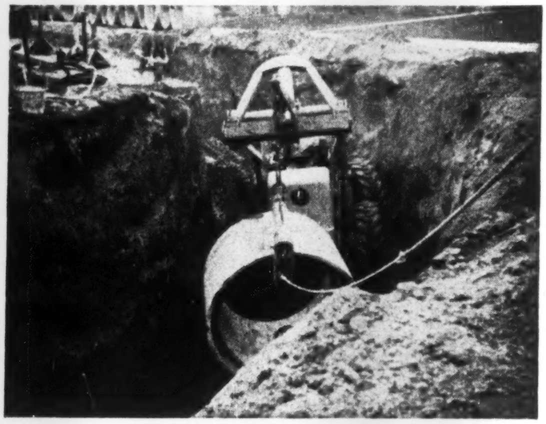
SPEEDY STABILIZING— "PAYLOADER" tractor-shovel breaks lumps with its bucket as it pulls a double sheepsfoot at a 4 mph pace to compact highway fill.



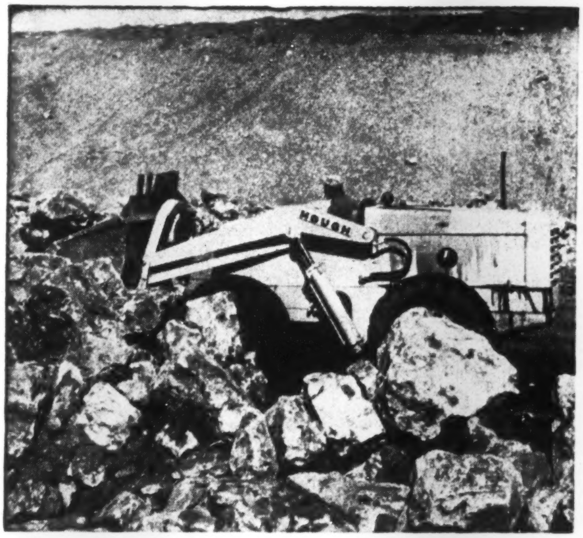
MIGHTY MOLE— They wanted a cellar under a factory building, so a 12 cu. ft. "PAYLOADER" tractor-shovel did the job with speed and satisfaction.



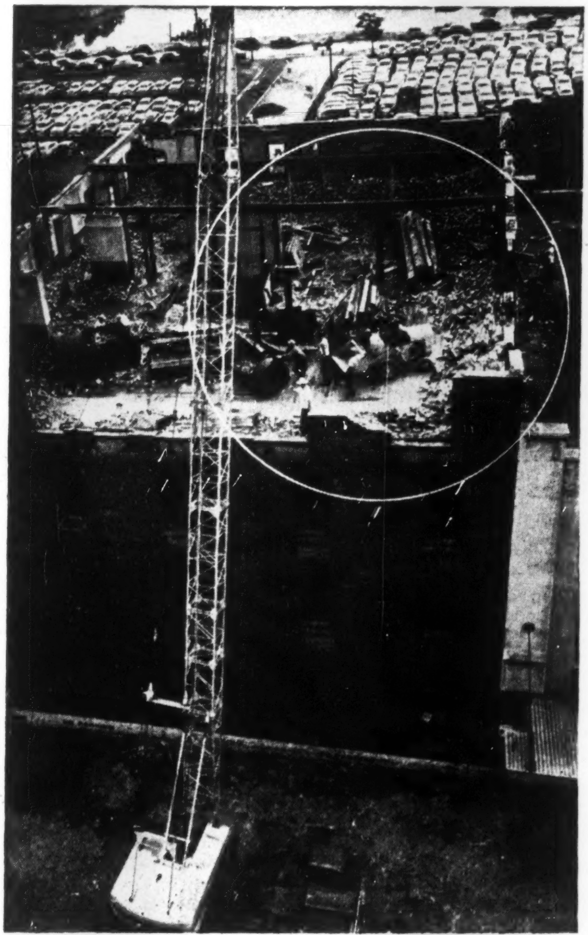
TUNNEL DRIVER— 4-wheel-drive "PAYLOADER" tractor-shovels help Bates & Rogers Construction Corp. muck railroad tunnel — also lifted forms and handled roadbed ballast and aggregate for concrete lining.



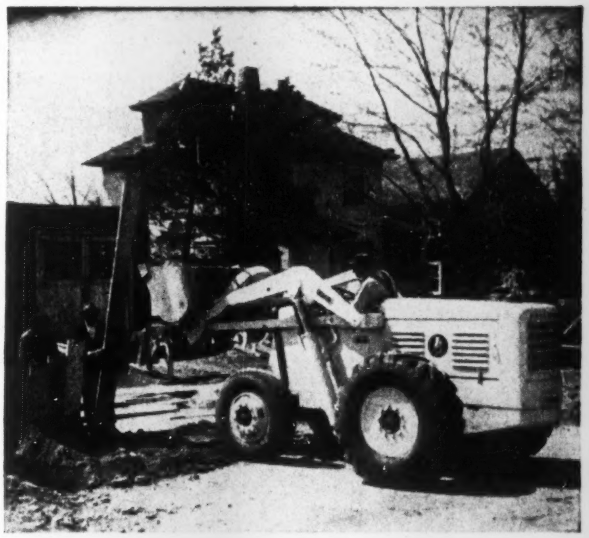
IN THE TRENCH— Here's a "PAYLOADER" with Crane Hook attachment right in the trench spotting 60" sewer pipe for the setters. It also graded and backfilled on this big sewer construction job at Denver, Colo.



DAM ROCK—This 1½ yd. 4-wheel-drive "PAYLOADER" stockpiled and loaded 40,000 yds. of rip-rap rock to help speed the construction of Shadehill Dam in South Dakota.



HIGH FLYER—Down comes the building with the help of a 12 cu. ft. "PAYLOADER". Lifted to the top floor by a truck crane, it scoops up brick and other debris, carries and loads them into skips for the crane.



SEWER BUILDER—The 1¼ yd. "PAYLOADER" was an all-around busybody on this sewer job. It loaded excess dirt, carried the pipe, backfilled the trench and pulled sheathing.

CUTS BRICK COSTS—4-wheel-drive "PAYLOADER" with forks places pallets of bricks handy for the layers—saves handling and breakage—greatly reduces brickwork costs.

THE FRANK G. HOUGH CO.
112 SUNNYSIDE AVE.
LIBERTYVILLE, ILLINOIS

Please send data on PAYLOADER Sizes checked:

1½ yd. ☐ 1 yd. ☐ ½ yd. ☐
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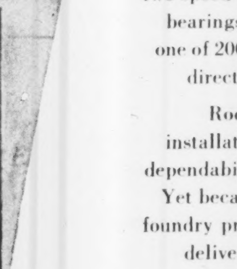
Standard Sizes: 6" to 108" diameter
Larger Rectangular Sizes
for Special Installations

Illustrated is a 54" x 54" cast iron bronze-mounted sluice gate with the stem encased in an oil cylinder to prevent freezing. This special non-freezing stem and the selective two speed floor-stand—equipped with Timken tapered roller bearings—are part of the *standard* Rodney Hunt line—one of 2000 sluice gate combinations that can be ordered directly from the Rodney Hunt catalog!

Rodney Hunt sluice gates are characterized by easy installation, a high degree of water-tightness and complete dependability. These gates are the finest quality obtainable! Yet because of new manufacturing equipment and modern foundry practice, they are competitively priced . . . and delivered to meet your construction schedule!

Free! 232-page color catalog

This is one of the most complete works in the field. It contains photographs, drawings, specifications and complete descriptions of our sluice gates, timber gates, hoists, valves, racks and rakes, plus a valuable 28-page section of engineering data on hydraulic problems.

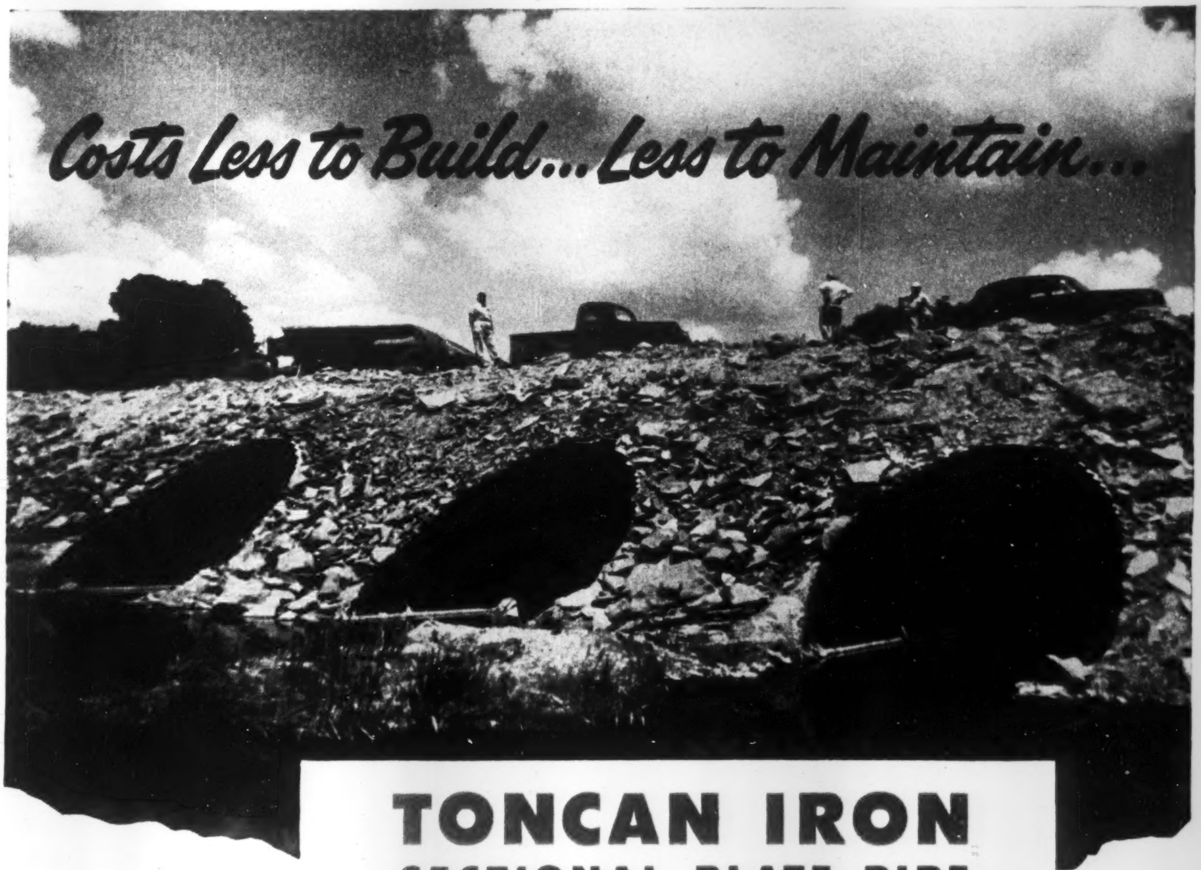


This important catalog was specially prepared and edited for consulting engineers, contractors and other executives who are *actively* engaged in the water control field. Please write on your letterhead for Catalog WCA-952. Rodney Hunt Machine Co., 85 Lake St., Orange, Mass., U.S.A.

RODNEY
HUNT®

Water Control Apparatus Division

Manufacturing Engineers Since 1840



TONCAN IRON
SECTIONAL PLATE PIPE

Here's the economical, trouble-free way to handle extra-large volumes of water . . .

Simply bolt together pre-cut, pre-punched Toncan Iron Plates which are shipped knock-down for easier handling and at lowest freight costs. You can assemble Toncan Iron Sectional Plates with unskilled labor, anywhere, even in coldest weather. No problems of unloading and setting heavy units, no worries about breakage.

Once installed, Toncan Iron Sectional Plate Structures behave like familiar Toncan Iron Corrugated Metal Pipe . . . flex with shifts in subsoil and backfill, maintain their original water-carrying capacity through the years, do not spall.

Because Toncan Iron contains twice as much copper as ordinary copper-bearing steels and irons plus just the right amount of molybdenum to make the copper most effective in resisting rust, Toncan Iron Structures will last for years in any type of soil, carrying almost any kind of water.

Get "specs" and data from a Toncan Iron Manufacturer listed below. Or write to . . .

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

Toncan Iron Drainage Products include:

- **Corrugated Metal Pipe**
- **Perforated Corrugated Metal Pipe**
- **Sectional Plate Pipe**
- **Sectional Plate Arches**
- **Corrugated Metal Arch-Pipe**
- **Sectional Plate Arch-Pipe**
- **Corwel Subdrainage Pipe**
- **Bituminous Coated and Paved Pipe**

Call the Toncan Iron Man –that's your best drainage plan
TONCAN IRON

Manufacturers of Toncan Iron Drainage Products

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Avoid Breakdowns!

Keep your motorized equipment "in the pink" with Delvac Oils—they keep engines clean!

One shift per day or round-the-clock operation—whatever the demands on your Diesel and heavy-duty gasoline engines, you can keep them on the job *more continuously* by protecting them with famous Delvac Oils!

A new *super-detergent* formula now enables Delvac Oils to keep engines *amazingly clean.* These top-quality oils resist oxidation and foaming, guard bearings, pistons, cylinders and rings against corrosion and wear. Your engines last longer, need fewer repairs and overhauls, produce power more efficiently. You stay on schedule more easily—save on fuel, oil, maintenance.

Ask your Socony-Vacuum Representative for Delvac Oils—recommended or approved by leading engine and equipment builders.

Here's Practical Help for Contractors...

Socony-Vacuum gives you...

- Help on maintenance problems.
- Individual, tested lubrication schedules.
- Advice on correct handling, storage and application of lubricants.
- One source of supply—available everywhere.
- Simplified inventory—with...

1. **DELVAC OILS**—for all gasoline and automotive-Diesel engines.
2. **MOBILUBE GX**—multi-purpose gear lubricant for all enclosed gears—manually operated transmissions, rear axles and final drives.
3. **MOBILGREASE**—in types and grades for proper lubrication of all chassis parts and engine accessories.

DELVAC OILS

Delvac 900 Series Oils: Under API Classification, recommended "For Services MS, DG,"
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SOCONY-VACUUM

Correct Lubrication for Contractors

THE FLYING RED HORSE COMPANIES: SOCONY-VACUUM OIL CO., INC., MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP.

Steel Erection Moves Fast with High-Strength Bolts

Erection proceeds at a smooth, rapid pace when Bethlehem High-Strength Bolts are used to join the structural members. These special heat-treated bolts can be installed quickly by a two-man team using a holding wrench and an impact wrench. The bolts are used with hexagonal nuts and hardened washers, and take the place of field-driven rivets.

In erecting steel with Bethlehem High-Strength Bolts, two hardened washers are used with each bolt, one under the head, the other under the nut. This permits the development of maximum clamping force without deforming the connected material.

When bolts pass through beam- or channel-flanges having a sloping inner face, a bevel washer is required to provide a square seat for the bolt head or nut. Bethlehem furnishes these bevel washers in two types, for use with wide-flange beams and standard beams or channels.

Bethlehem High-Strength Bolts are manufactured at our fasteners plant at Lebanon, Pa. They are heat-treated by a process of quenching and tempering, to meet the requirements of ASTM Specification A325.

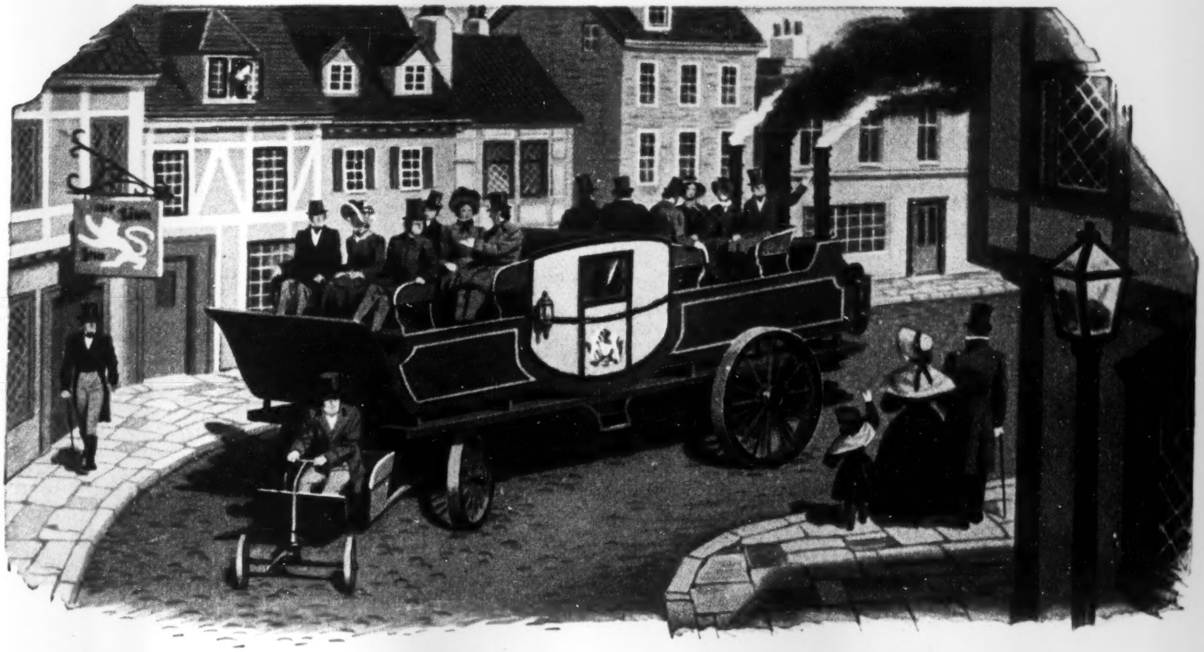
A request to the nearest Bethlehem office will bring you our interesting booklet, "High-Strength Bolting for Structural Joints."

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Bethlehem supplies every type of Fastener



Power Steering was appreciated 125 years ago

This steam coach which appeared in England about 1827 had a type of power steering. The little wheels in front, when turned by the elegant coachman, would act as a pilot to pull the main front wheels around as the vehicle moved. Power derived from the forward motion did most of the work. It is interesting to note that the value of power steering was appreciated more than a century ago.

Modern Vickers Hydraulic Power Steering is appreciated not only by the truck or bus driver, but also by the man who pays the bills. The driver, relieved of all the exhausting work of steering, stays fresh and alert. If driving a truck, he gets more done in a day. If driving a bus, he gets through traffic easier, maintains schedules, and doesn't get a fatigue grouch that repels patronage. Relief from fatigue reduces the accident hazard of any driver.

Get more information on fingertip, easy, dependable Vickers Hydraulic Power Steering. Write for Bulletin 5101.

6169

VICKERS Incorporated

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VICKERS hydraulic POWER STEERING

is Effortless, Positive and Shockless

ATLANTA, GEORGIA
Another
DRESSER-COUPLED
Steel Line

DELIVERS WATER CHEAPER!

Ditch test at 150 psi proves joints bottle-tight—wins approval for quick backfilling in heavy traffic areas.

Installing the West Belt feeder main, to increase Atlanta's water supply and boost pressures, meant laying a 48-inch main through densely populated areas. Atlanta engineers—after finding the first 1000 feet of Dresser-Coupled steel pipe absolutely tight—permitted the contractor to backfill as fast as the joints were completed.

More line was laid in less time because lighter weight steel pipe meant easier handling. Long pipe lengths required fewer joints. Use of Dresser Couplings meant faster pipe joining, small crews, easier supervision and less heavy equipment.

The beam strength of steel pipe, plus the resilience of both pipe and couplings, assured Atlanta engineers a rugged, flexible line that will be permanently tight . . . maintenance free.

✓ ***BE SURE*** **you get the *best* line at the *best* price. Always put steel pipe and Dresser Couplings in *your* specifications.**

DRESSER® COUPLINGS

Dresser Manufacturing Division, 59 Fisher Ave., Bradford, Pa. (One of the Dresser Industries). Warehouses: 1121 Rothwell St., Houston, Texas; 101 S. Bayshore Highway, South San Francisco, California. Sales Offices: New York, Philadelphia, Chicago, Houston, South San Francisco. In Canada: Toronto, Ont.

SPREAD HARSH DRY CONCRETE FAST

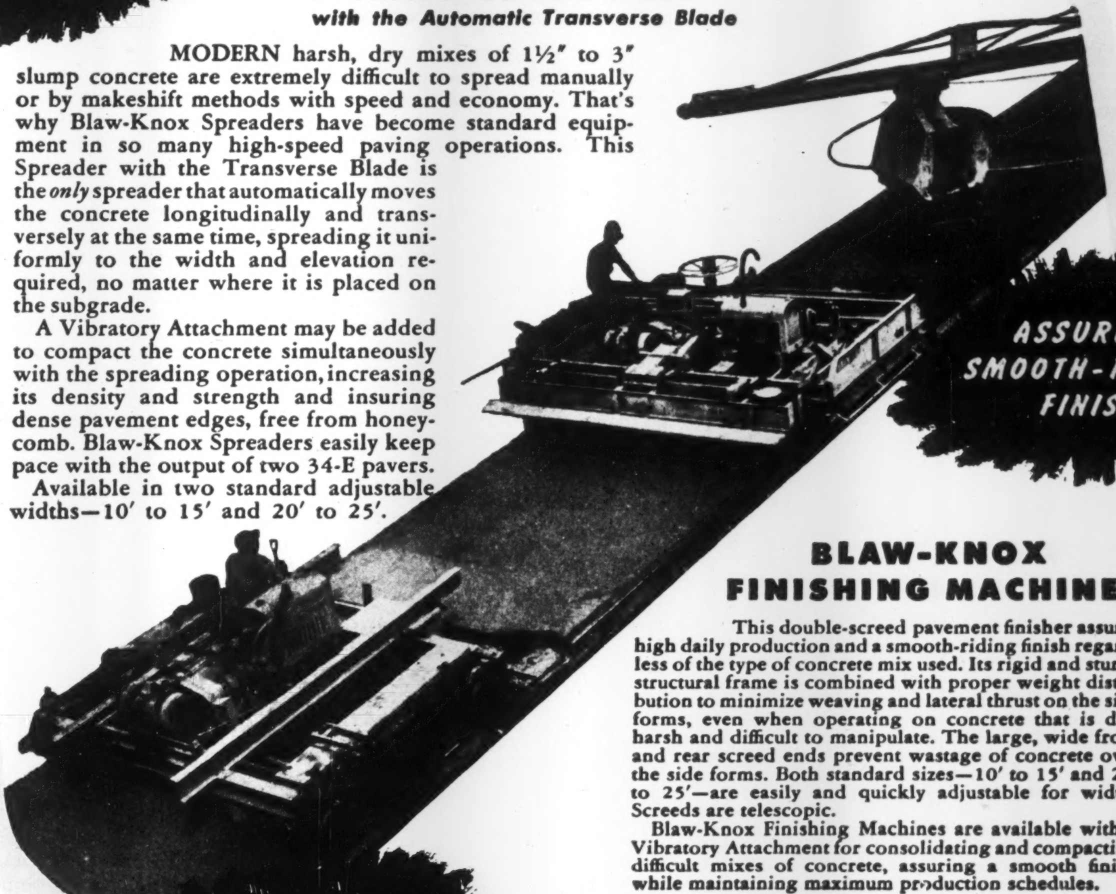
BLAW-KNOX CONCRETE PAVING SPREADERS

with the Automatic Transverse Blade

MODERN harsh, dry mixes of 1½" to 3" slump concrete are extremely difficult to spread manually or by makeshift methods with speed and economy. That's why Blaw-Knox Spreaders have become standard equipment in so many high-speed paving operations. This Spreader with the Transverse Blade is the *only* spreader that automatically moves the concrete longitudinally and transversely at the same time, spreading it uniformly to the width and elevation required, no matter where it is placed on the subgrade.

A Vibratory Attachment may be added to compact the concrete simultaneously with the spreading operation, increasing its density and strength and insuring dense pavement edges, free from honeycomb. Blaw-Knox Spreaders easily keep pace with the output of two 34-E pavers.

Available in two standard adjustable widths—10' to 15' and 20' to 25'.



ASSURE A SMOOTH-RIDING FINISH

BLAW-KNOX FINISHING MACHINES

This double-screed pavement finisher assures high daily production and a smooth-riding finish regardless of the type of concrete mix used. Its rigid and sturdy structural frame is combined with proper weight distribution to minimize weaving and lateral thrust on the side forms, even when operating on concrete that is dry, harsh and difficult to manipulate. The large, wide front and rear screed ends prevent wastage of concrete over the side forms. Both standard sizes—10' to 15' and 20' to 25'—are easily and quickly adjustable for width. Screeds are telescopic.

Blaw-Knox Finishing Machines are available with a Vibratory Attachment for consolidating and compacting difficult mixes of concrete, assuring a smooth finish while maintaining maximum production schedules.

MECHANIZE THE ENTIRE JOB FOR . . .

HIGH-SPEED, LOW-COST CONCRETE PAVING CONSTRUCTION

Mechanization is the key to greater efficiency and economy in modern concrete paving operations. And the key that opens the door to greater profit on *your* job is 100% mechanization with the Blaw-Knox "Complete Package" of concrete construction equipment, developed to bring unified, balanced, "assembly-line" methods to road building operations. The Blaw-Knox "Complete Package" of cost-cutting equipment contains every piece of equipment you need, from forms to finisher, to give you the step-by-step mechanization that assures high-speed, low-cost concrete paving construction.

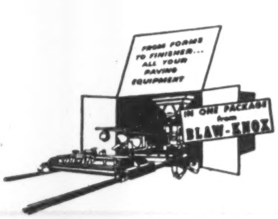
Blaw-Knox is your *only* source for a completely mechanized outfit . . . a one-responsibility "package" available on one order, in one shipment and with only one financial arrangement. One responsible distributor organization simplifies maintenance and supply of genuine factory replacement parts. One Blaw-Knox trained man can service *all* your "package" equipment. Start mechanizing your paving outfit today to get your share of the big jobs. See your nearest Blaw-Knox distributor for complete details.

USE THE BLAW-KNOX

"Complete Package"

of concrete paving equipment

It includes: Clamshell Buckets • Aggregate and Cement Batching Plants • Steel Road Forms • MultiFoote Concrete Pavers • Precision Subgraders • Concrete Paving Spreaders • Finishing Machines


FROM FORMS TO FINISHER... ALL YOUR PAVING EQUIPMENT
IN ONE PACKAGE from BLAW-KNOX

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Blaw-Knox Company
BLAW-KNOX EQUIPMENT DIVISION

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WATER Paces Lakeland's Business Growth!

Allis-Chalmers Helps 'World's

THE "WORLD'S CITRUS CENTER" is being helped by Allis-Chalmers in the race to keep water works ahead of population growth. In ten years, Lakeland's population has increased 70 percent, meters have doubled, and gallonage pumped has nearly tripled!

Lakeland is so named because of the 12 lakes within its city limits. It is near the geographical center of Florida, in Polk county . . . producer of a third of all Florida citrus, two thirds of U. S. phosphate, and more cattle than any other county in the state.

Lakeland gets its water — 154,363,500 gallons per month average in 1952 — from 11 deep wells running down to 1201 ft in depth. Storage capacity is 1,778,000 gallons. Following aeration, Allis-Chalmers pumps . . . driven by Allis-Chalmers motors . . . using Allis-Chalmers generated power . . . force the water into the city mains.

Lakeland has learned by experience the wisdom of depending on Allis-Chalmers for a complete range of public works equipment. Some of their A-C equipment has been in operation for over 30 years and maintenance has been "practically nil." A-C equipment at Lakeland ranges from three turbine-generators through transformers, M-G sets, and controls to motors and pumps of many sizes.

When *your city* plans expansion or modernization, do as Lakeland and other leading cities are doing — take advantage of Allis-Chalmers experience as builder of the world's widest range of public works equipment. Literature on all products available; Public Works Bulletin 25C6607A and Pump Bulletin 08B6146B just off the presses. For your copies, just call your nearest A-C sales office or write to Allis-Chalmers, Milwaukee 1, Wisconsin.

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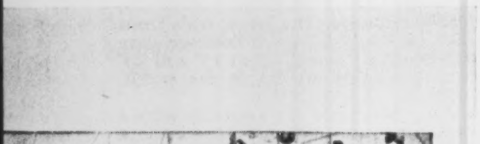
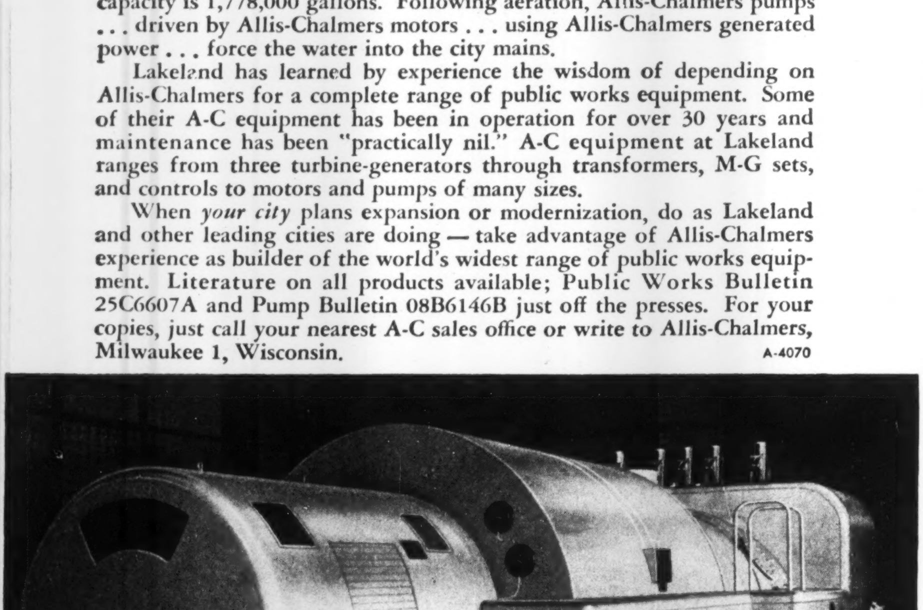
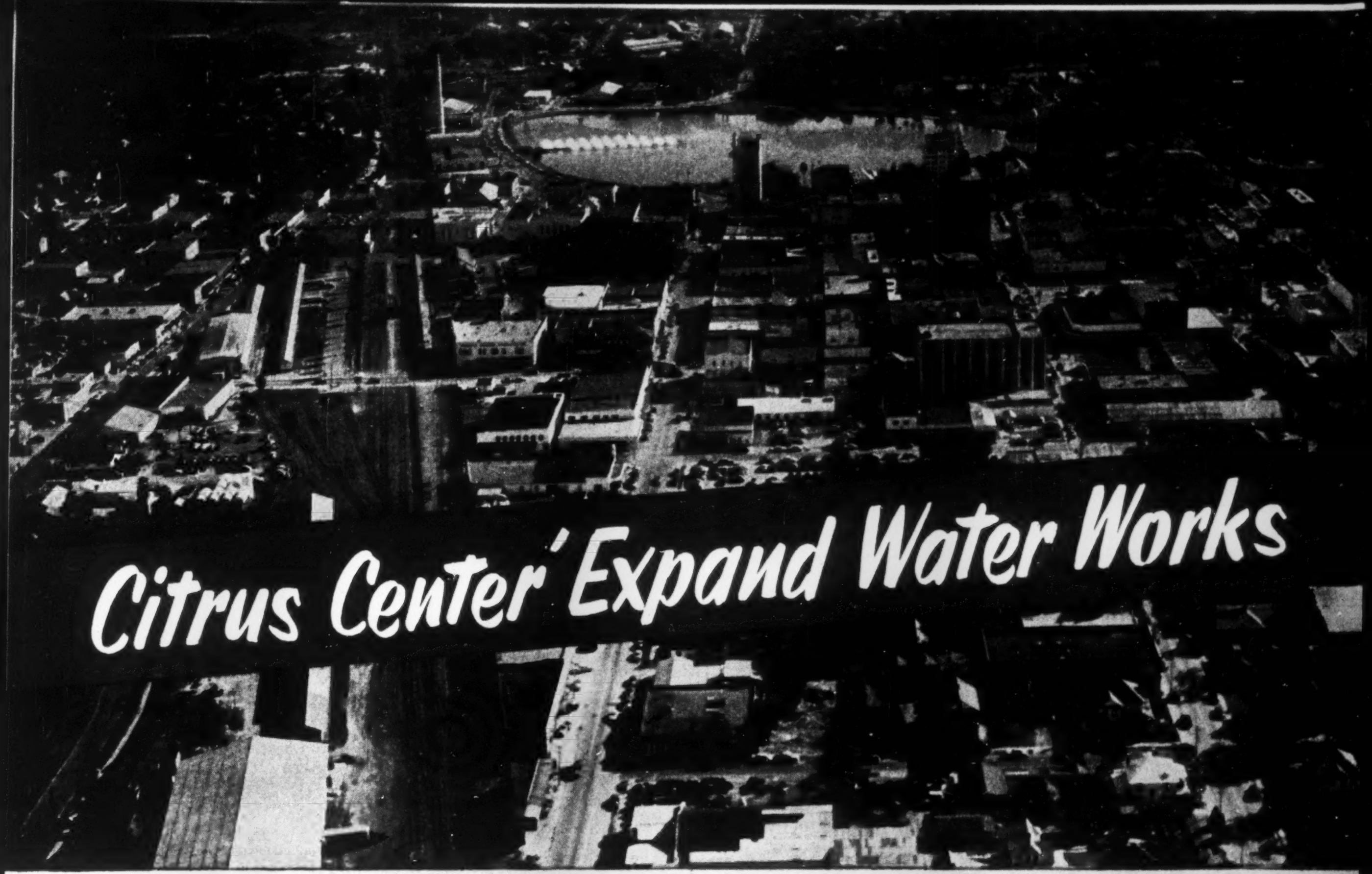


POWER TRANSFORMERS were furnished by Allis-Chalmers. Those above are 833 kva, single phase, self-cooled units in Lakeland suburban substation. Other electrical equipment supplied includes controllers for the 150 hp deep well pump motors.



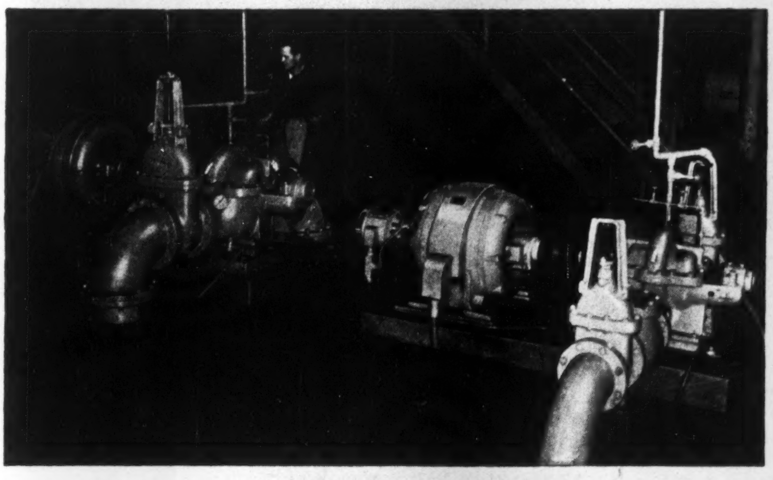
NEW POWER HOUSE features Allis-Chalmers 20,000 kw steam turbine generator unit. In addition to the steam turbine, hydrogen cooled generator, main and pilot exciters, and hydrogen control equipment, A-C also furnished the three 6 x 4 in., 450 gpm, 1150 psi boiler feed pumps.

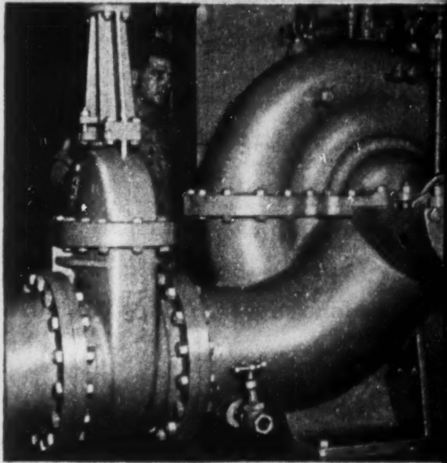


Citrus Center' Expand Water Works

LAKELAND FROM THE AIR, looking east. Over 600,000 people live in a 50 mile radius from Lakeland, Fla. Old power house, containing two Allis-Chalmers 5000 kw steam turbine generator units and associated equipment, is on left shore of Lake Mirror in center of above photograph.

CITY MAINS ARE SUPPLIED by Allis-Chalmers pump-motor teams ranging in capacity from 2000 to 4000 gpm each. Typical setup shown below: at left is a 12 x 10 in. pump rated 4000 gpm at 160 ft head, driven at 1800 rpm by 200 hp motor. At right is a 2000 gpm, 8 x 8 in. pump driven by a 100 hp, 1800 rpm synchronous motor.





PUMPS RANGE IN SIZE from 1¼ x 1¼ in. to this 16 in., 6000 gpm, 16 ft head unit furnishing condenser cooling water in old power house. Here Allis-Chalmers supplied two 5000 kw steam turbine generator units, boiler feed and condenser circulating water pumps, and crane motor-generator set.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

Builders of the World's Widest Range of Public Works Equipment

Research and Development bring you this finer-than-ever pipe

You can't better a product like cast iron pressure pipe—with its unparalleled record of long life, economy and efficiency—by waving a wand. Yet the story of how the best product in its field has been made *still better* can be told in a paragraph.

Modernized cast iron pipe is a result of the sum total of recent product and process improvements attained by research and development.

It is centrifugally-cast and, when needed, centrifugally cement-lined. It is tougher, stronger, more uniform in quality. It is tuberculation-proof with sustained carrying capacity for the life of the pipe.

If you want the most efficient and economical pipe ever made for water distribution, your new mains will be laid with *modernized* cast iron pipe with either mechanical or bell-and-spigot joints. Cast Iron Pipe Research Association, Thos. F. Wolfe, Managing Director, 122 So. Michigan Ave., Chicago 3.

This cast iron water main, uncovered for inspection, is in good condition after over a century of service in Detroit, Mich. —one of more than 45 cities with century-old water or gas mains in service.

Modernized **cast iron**

CAST Q IRON

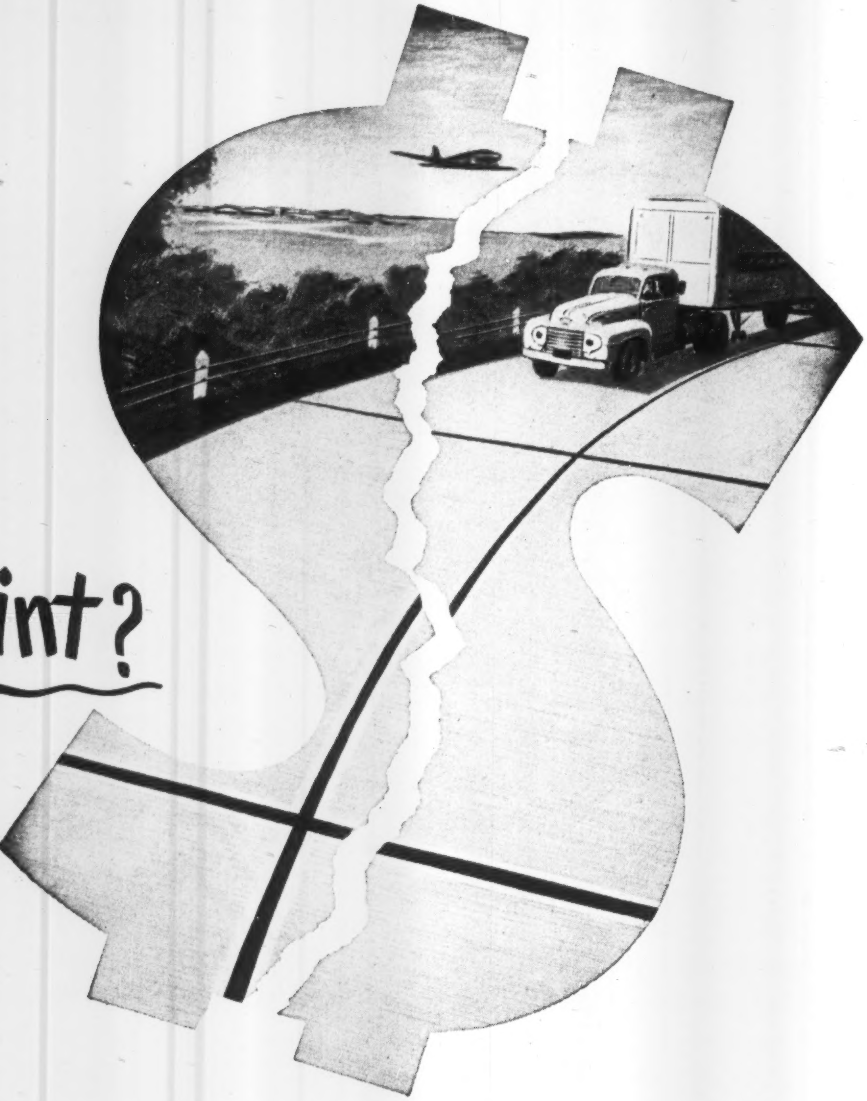
The Q-Check stencilled on pipe is the Registered Service Mark of the Cast Iron Pipe Research Association.

pipe

for Modern Waterworks Operation

Are your maintenance costs

Out of joint?



Joint-sealing every year costs too much money . . . cuts deep into maintenance budgets. Put *one* application of FLINTSEAL* in your concrete pavement joints . . . *and then forget those joints for years!*

Unlike the old types of bituminous fillers which crack and leak in cold and flow and smear in heat, rubber-asphalt Flintseal stays put . . . remains extensible and compressible through expansion and contraction of the pavement slabs.

Seals out water—*positively* . . . yet is flexible and resilient . . . bonds to joint walls perfectly!

So don't take chances! Look at savings over the years by using Flintseal. Write for complete data.

*Reg. U. S. Pat. Off.

THE FLINTKOTE COMPANY, *Industrial Products Division,* 30 Rockefeller Plaza, New York 20, N.Y.—55th & Alameda Sts., Los Angeles 54, Calif.

In Toronto, Ontario: THE FLINTKOTE COMPANY OF CANADA, LTD.

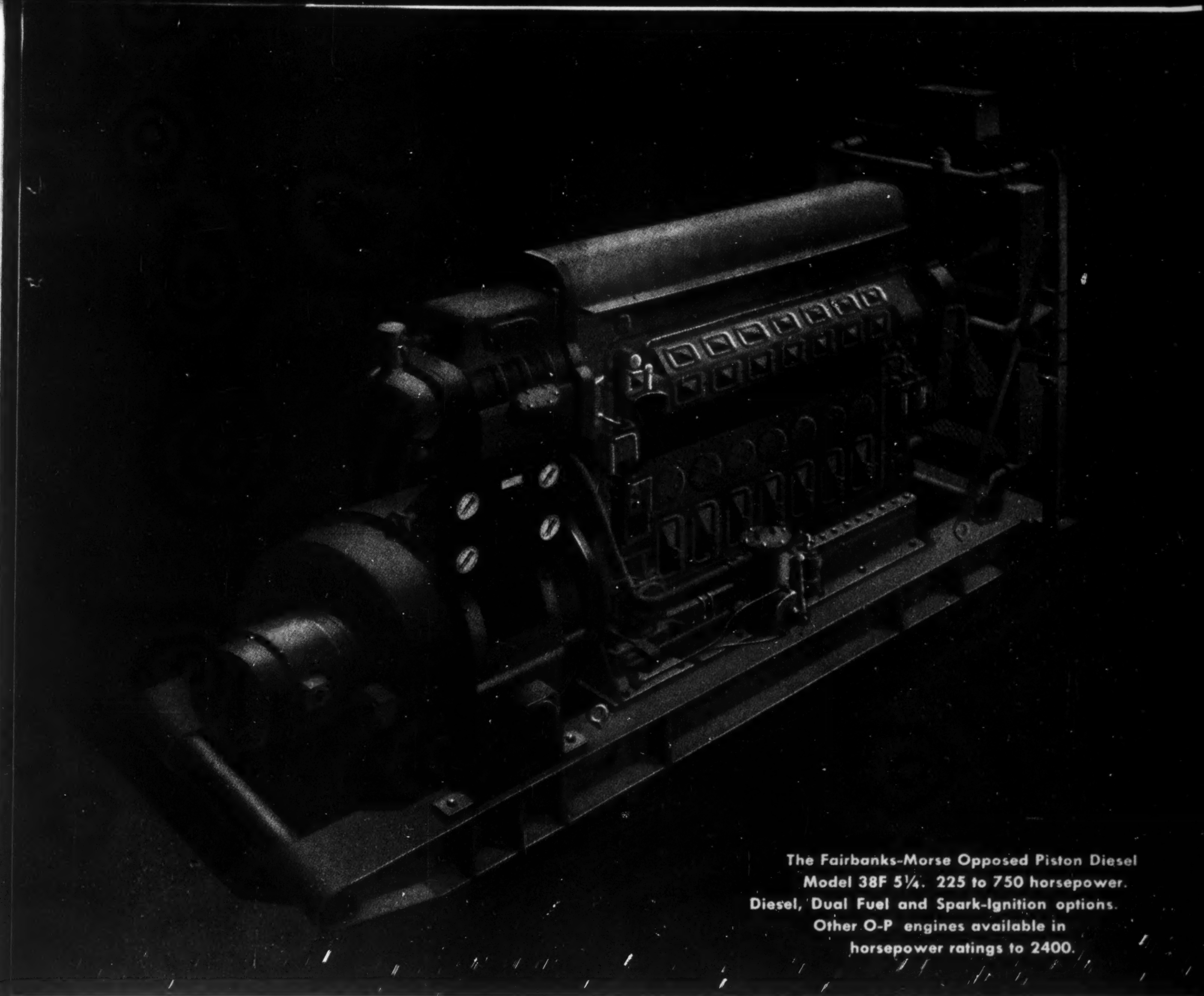
In London, England: Industrial Asphalts Company, Ltd.

For airports: **Flintseal JFR (jet fuel resistant) is used to seal joints in airfield runways, taxiways, aprons and hangar floors.**

Specialized Experience—
Over 50 Years At Your Service—
by phone, mail or personal call...
no obligation.

Flintseal

HOT-POURED
JOINT-SEALING COMPOUND



The Fairbanks-Morse Opposed Piston Diesel
Model 38F 5¼. 225 to 750 horsepower.
Diesel, Dual Fuel and Spark-Ignition options.
Other O-P engines available in
horsepower ratings to 2400.

. . . always a need for something Finer

It was designed and built without thought of price . . . built only to give the maximum of heavy-duty horsepower in a minimum of space . . . plus an unvarying reliability upon which you could stake a balance sheet of operating costs and profits.

The price?

Not quite as low as conventionally designed and conventionally manufactured engines, but low enough to insure that no one who wants and needs an engine which gives more, need forego its ownership. For the more difficult tasks of producing power, this engine is a fulfilling answer.

Fairbanks, Morse & Co., Chicago 5, Illinois.

FAIRBANKS-MORSE

a name worth remembering when you want the best

DIESEL AND DUAL FUEL ENGINES • DIESEL LOCOMOTIVES • RAIL CARS • ELECTRICAL MACHINERY • PUMPS • SCALES • HOME WATER SERVICE EQUIPMENT • FARM MACHINERY • MAGNETOS

Reduce lubrication time LeTourneau-Westinghouse

Have you ever checked how many hours and how much money go into preventive maintenance over a period of 6 months? This time and cost, which looks small on a daily basis, is a big item over a period of time. You undoubtedly would like to cut it down. A regular program of maintenance helps, as you well know. So does purchase of machines that have fewer fittings, fewer points of service. For your convenience, we have charted earthmoving haulers, scrapers and tractors below. Look it over . . . note that LeTourneau-Westinghouse units have the fewest check-points in every category. For example:

On Rear-Dumps, 11 fittings vs. 233

On 50-ton "A" Tournarocker, there are only *11* grease fittings. There are *233* on a competitive 40-ton rear-dump.

One company using both types of haulers to haul conglomerate rock overburden (Colitz Coal Co., Pottsville, Pa.) reports it takes 8 hours to completely lubricate a com-

COMPARATIVE MAINTENANCE REQUIREMENTS

		PER SHIFT OF 8 OR 10 HOURS		PER 1000 HOURS OR 6 MONTHS	
		Grease Fittings	Misc. Operations	Grease Fittings	Misc. Operations
REAR-DUMP HAULERS	Unit S	89	9	11,492	1,408
	Unit T	40	8	4,133	1,035
	Unit U	39	7	4,011	905
	LeTOURNEAU-WESTINGHOUSE				
	D TOURNAROCKER	**4**	**6**	**433**	**752**
	C TOURNAROCKER	**4**	**6**	**433**	**752**
	A TOURNAROCKER	**4**	**6**	**434**	**529**
SELF-POWERED SCRAPERS	Unit V	43	9	4,398	1,117
	Unit W	47	12	4,960	1,285
	Unit X	71	12	7,110	1,337
	Unit Y	58	10	5,833	1,004
	Unit Z	65		6,564	221
	LeTOURNEAU-WESTINGHOUSE				
	D Tournapull	**13**	**6**	**1,344**	**764**
	C Tournapull	**10**	**5**	**1,037**	**752**
	A Tournapull	**16**	**6**	**1,657**	**773**
TRACTORS	Comparable Crawler	6	2	876	384
	LeTOURNEAU-WESTINGHOUSE	**None**	**5**	**62**	**598**

HIGH-SPEED, RUBBER-TIRED HAULING • EXCAVATING • LIFTING EQUIPMENT

50% with units

petitive truck's many fittings . . . 2 hours to lubricate the big "A" Tournarocker. Says Co-Owner John Colitz, "Since using Tournarockers, we've cut operating costs 40%."

On Scrapers, 1789 fittings vs. 6245 to check per 1000 hrs.

Other LeTourneau-Westinghouse machines, like Tournapull and Tournatractor, also reduce lubrication time. One of the reasons is that LeTourneau-Westinghouse's use of electric motors places the power where it is needed . . . eliminates extra sheaves, long jack-lines, excess lubrication fittings. Competitive units use complicated PCU cable reeving or hydraulic systems requiring two or three times more maintenance.

For instance, Unit W has 38 sheaves to lubricate . . . C Tournapull has only 14 sheaves. In 1,000 working hours, "W" requires service of 4,960 grease fittings and 1,285 oil and other points. In same period of time, LeTourneau-Westinghouse's "C" Roadster requires servicing of only 1,037 grease fittings and 752 other lube points. These 1789 checks compare to 6245 on Unit W, 5515 on Unit V, 8447 on Unit X, 6837 on Unit Z and 6385 on Unit Y.

On tractors, 4 tires take place of 500 track parts

Tournatractor similarly cuts down lubrication time over crawler tractors by replacing 450 to 550 moving track parts with 4 rubber-tired wheels. Chart shows that in 6 months you'll spend twice as much time servicing your crawler as you'll put in on your Tournatractor. If your tractor is working in a gritty material, like sand, your crawler will require even more frequent lubrication and rebuilding with consequently greater loss of working time. Your own time records show how important a "minor" expense like lubrication costs can be.

There are dozens of other LeTourneau-Westinghouse cost-cutting features it will pay you to investigate before you buy your next machine!

C TOURNAPULL

Supt. Paul M. Turner, Beckham Construction Company, of Perry, Ga.: "It's the best rubber-tired equipment I've ever used. The oldest unit doesn't use a drop of oil after 3 years' use. It takes 1 hour and 15 minutes to fuel and grease a competitive self-propelled rig as against 15 minutes on the C Tournapull."

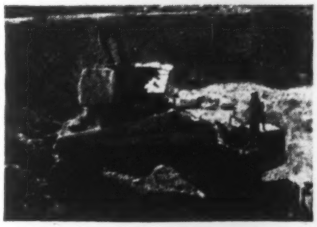
D TOURNAPULL

Willie Lee, operator for J. R. Dunn Lumber Company of Baxley, Georgia: "I save about 10 minutes each morning greasing the 'D' as compared to a crawler."

It's what users say that counts!

TOURNATRACTOR

W. E. Miller, operator and foreman for Contractor Finley P. Smith of Ft. Lauderdale, Fla.: "You hardly have to grease these Tournatractors at all. Complete greasing and oil change takes you less than 30 minutes. Same job with a crawler takes over an hour and a half. Daily greasing of Tournatractor takes about 5 minutes, counting getting grease gun, etc."



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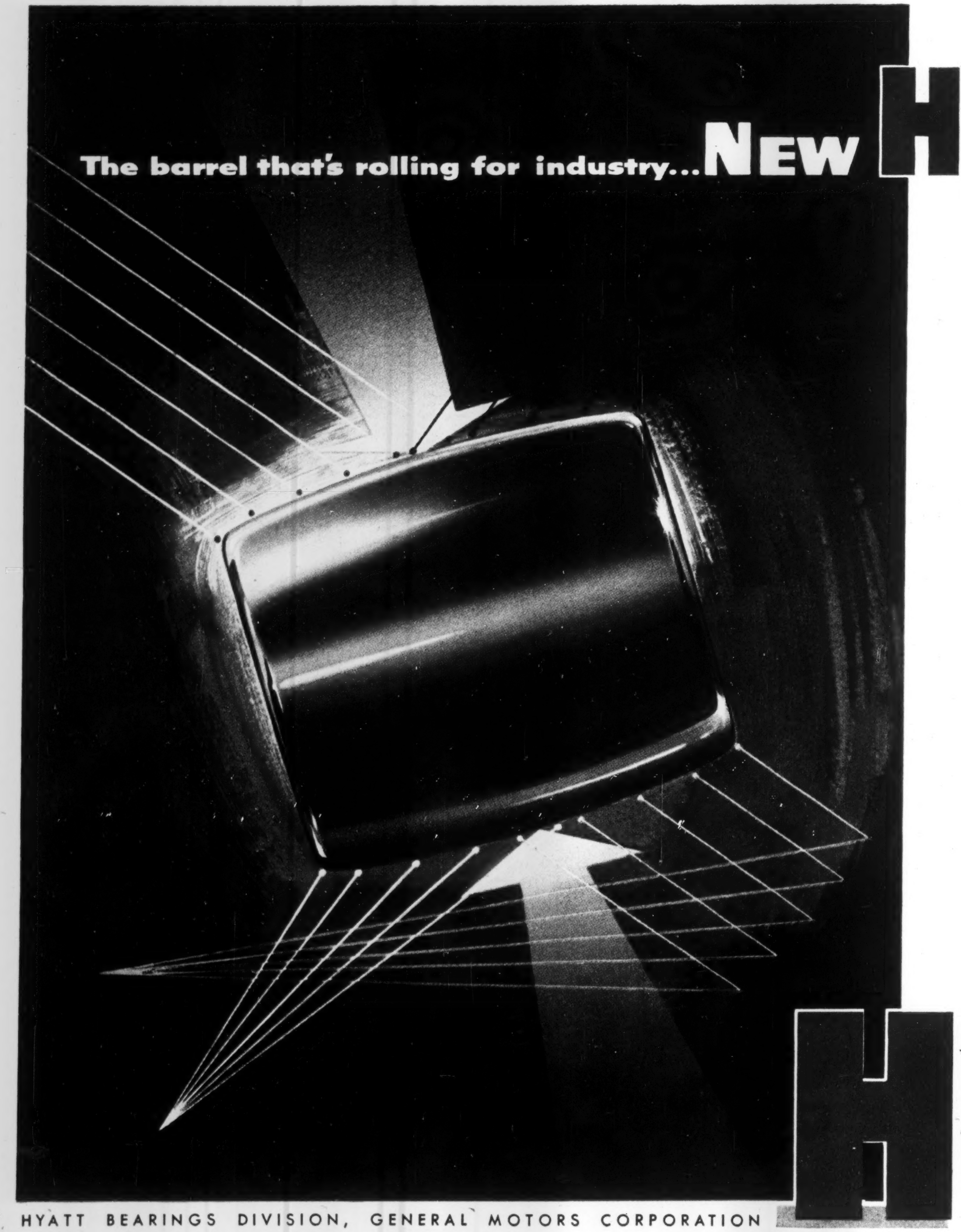
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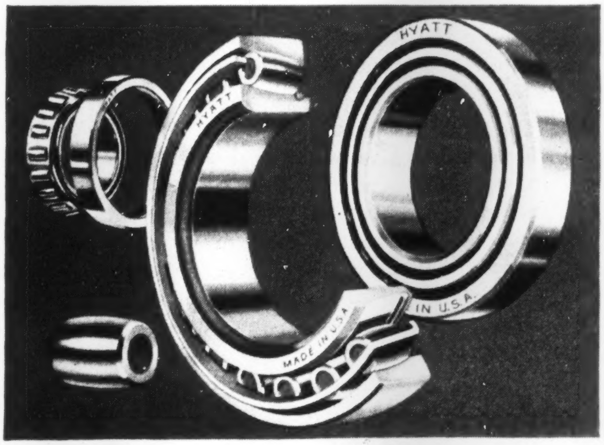

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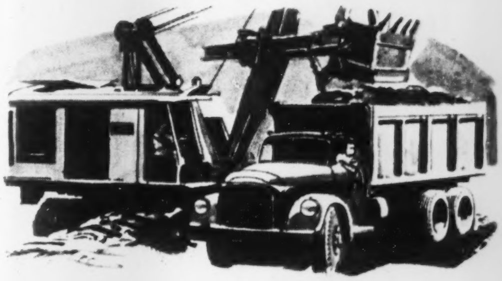

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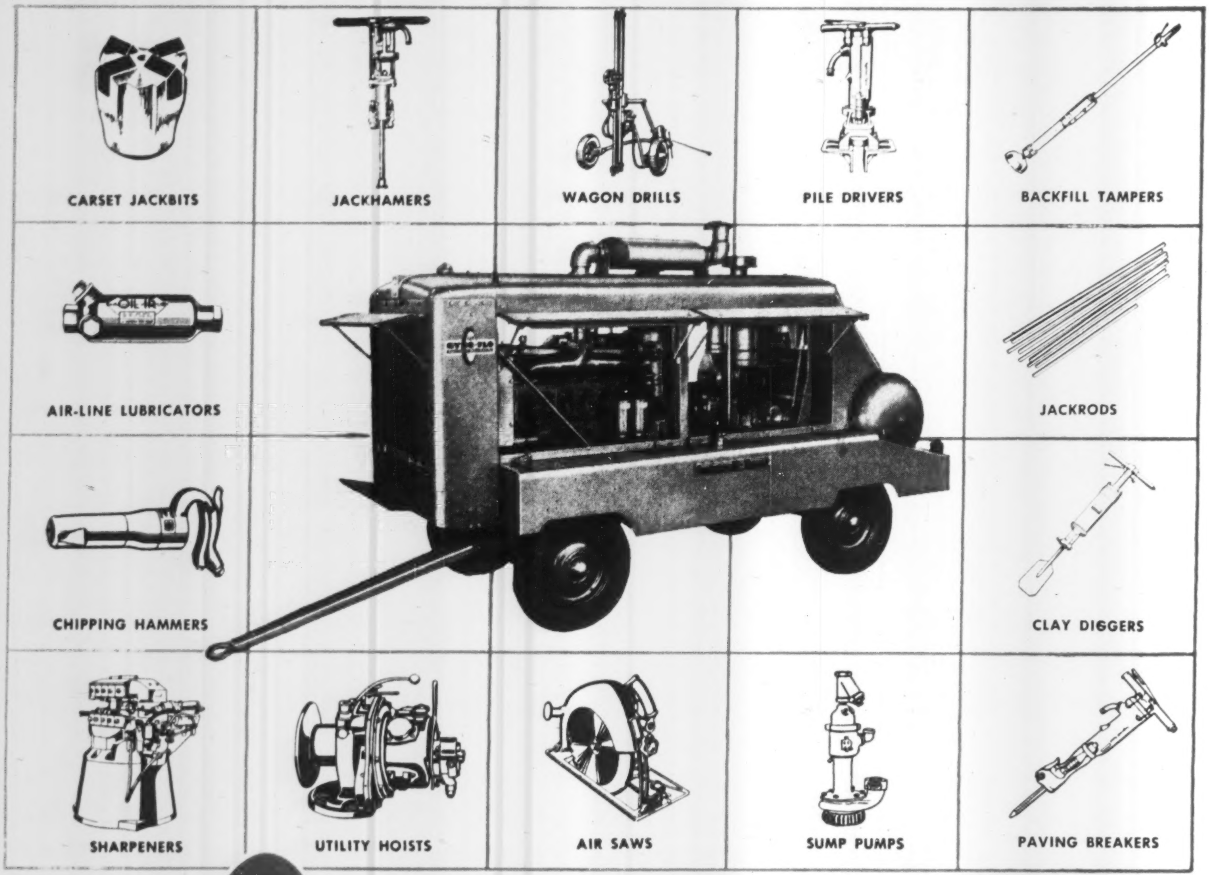
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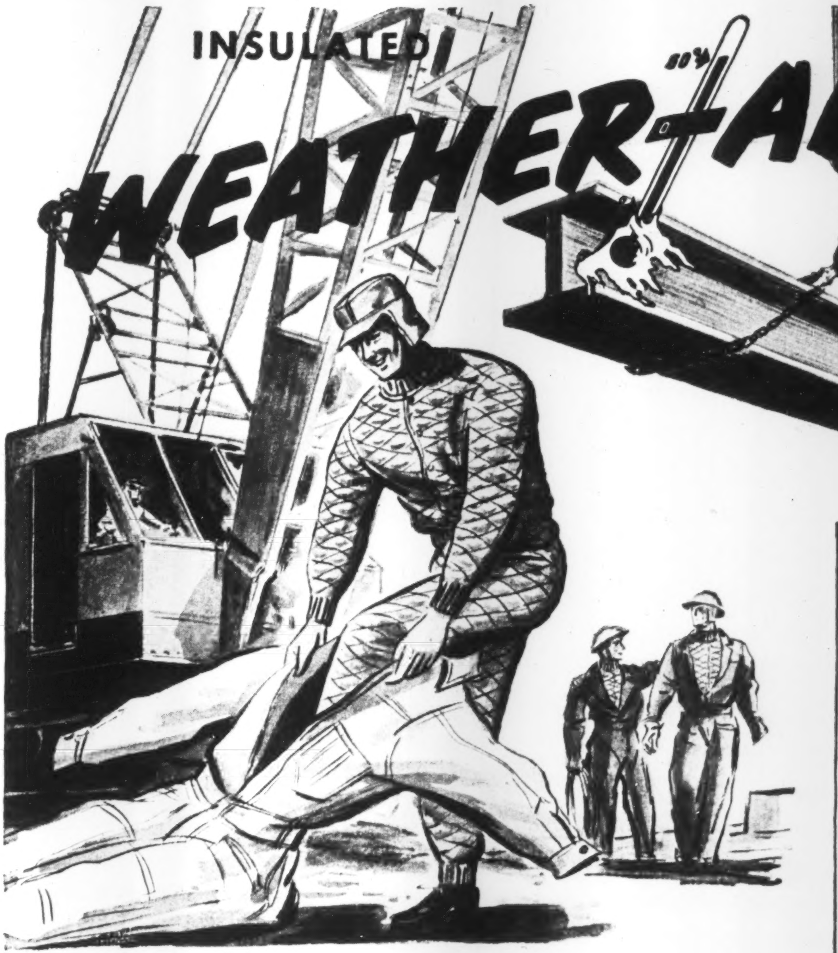

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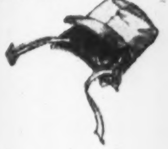

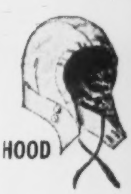

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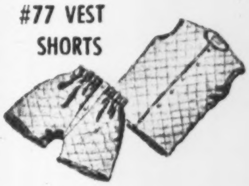

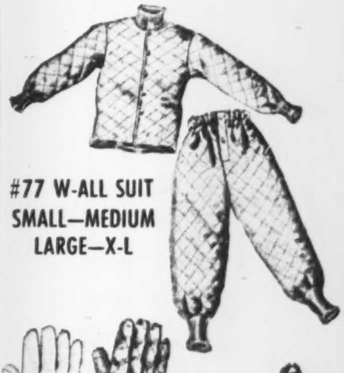

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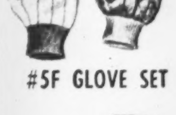

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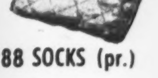

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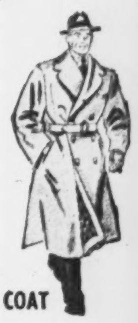

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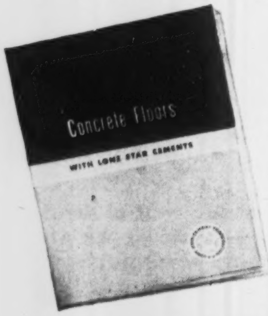

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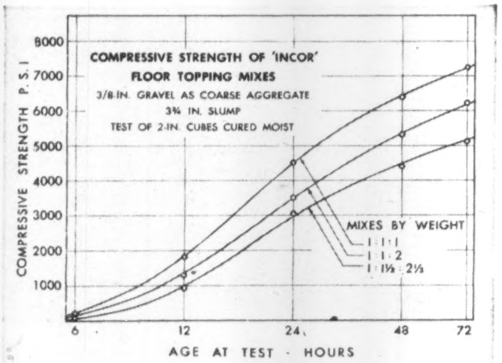

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WASHINGTON OBSERVER

Architect-engineer contracts for Spanish Bases may be signed within the next week or so. Officials hope they can pick the firm that will do the job before Maj. Gen. Lee B. Washtowne, Air Force Director of Installations, leaves for Europe. Idea is to have key men of the A-E contractor make the rounds of the Spanish sites with him.

Dozens of possible A-E firms are on the list of prospects being gone over by Navy and Air Force. Bureau of Yards and Docks has the job of picking the A-E contractor. Construction contractor isn't likely to be picked before first of the year, at the earliest. It takes that much time to rough out the size and shape of the job to the point where it's possible to negotiate a construction contract.

Note: No equipment from North African bases will be sent to Spain until it has been approved by the contractors.

•

Commission on federal-state relations has strong bloc of governors who have been all-out for turning all gasoline taxation back to the states—Governors Shivers of Texas, Driscoll of New Jersey, and Thornton of Colorado. Commission finally got under way with swearing in of 15 public members at the White House last week.

•

Gray and Hutcheson of building trades and carpenters aren't giving up easily on Taft-Hartley changes they want. They took their case to President Eisenhower at the White House last week (see page 353). Experts guess that Ike will go part way in trying to clear up building trades problems concerned with T-H, but that he won't give them the closed shop.

•

New General manager of AEC is Maj. Gen. Kenneth D. Nichols, succeeding Marion W. Boyer, who is returning to Standard Oil of N. J. Nichols directed construction of Oak Ridge, other big installations for wartime Manhattan District. He comes to AEC from spot as head man of Army's research and development program. He'll become a civilian in his new job

•

A manufacturer's excise tax is a tempting place for the Administration to try to get back some of the revenue the Treasury will lose next year. It's doubtful, though, that Congress will go along.

So broadened retail excises are likely, some relief will be given hard-hit business such as transportation and amusement, but new levies will be put on, say clothing, furniture, cement, etc.

•

Allotments of public housing to cities around the country still goes on. Mayor Kennelly of Chicago buttonholed housing boss Albert Cole at a meeting recently for another bloc of public housing for his city. Chicago got some 1,800 units on the first go-around earlier this summer; Kennelly asked for another 1,800.

RYERSON STEEL
RYERSON

Another truckload of Ryerson re-bars rolls to the site of the world's largest underground garage. The project which will handle 2,356 cars is being constructed under the sponsorship of the Chicago Park District, Robert A. Black, Chief Engineer. John Griffiths & Son is the contractor; Ralph Burke, Inc. the engineering consultant.

$500 a day penalty-bonus contract!

Ryerson Meets Re-bar Schedule

Here's a job where it's vitally important that reinforcing steel be delivered absolutely on schedule. Because, during construction of this huge under-street garage, three of the busiest blocks of Chicago's Michigan Avenue are just a gaping hole in the ground. And Christmas traffic jams come closer every day.

That's why there is a penalty of $500 a day if the job is not completed on schedule. And that's one reason why the contractor selected Ryerson, known for dependable deliveries, as the source for reinforcing steel.

Day after day this summer and fall, Ryerson re-bars will be on the spot when needed. There can be no lagging shipments—but no pile ups either because storage space is at a premium in this congested area.

You can depend on Ryerson reinforcing service, too, from setting plans to steel on the site. Your re-bars will be cut and bent, accurately—metal-tagged for permanent identification. And to simplify purchasing you can order all other steel requirements from the same convenient source. On your next job call Ryerson for a lump sum or average pound price.

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$900 million in federal work is proposed for authorization

New list of flood control, rivers and harbors jobs will be subject to sharp congressional questioning

Flood control and rivers and harbors projects eligible for authorization at the next session of Congress total more than $900 million. The projects, all of which have been recommended to congressional committees in survey reports, will comprise the first program of new work to be put to a vote in four years.

Public works committees of the house and senate are expected to recommend better than half the amount of work on the new list.

The bill that will authorize projects on this list (see tables below and on page 74), of course, will not provide the appropriations necessary to put the work under contract. Money for the projects is voted separately; often much later, sometimes not at all.

Up for consideration will be around $460 million for Department of Agriculture upstream flood control programs (Table II), of which about $180 million is to be contributed by local interests; and about $330 million of new Army Engineer flood control projects (Table I) and more than $140 million of river and harbor work (Table III).

The Army Engineer list includes all projects that have been recommended by the Chief of Engineers for future construction, since the Public Works committees began dealing with the last authorization bill in early 1950.

• Well under 1950 bill—Next year's bill won't be as big as the 1950 act, which authorized $1.8 billion of projects. But it will be considerably larger than the 1948 measure, when a Republican Congress authorized only $160 million of potential jobs.

The Army Engineer rivers and harbors list contains 61 proposed projects that range in cost from $13,500 for Bellhaven, N. C., harbor, to $80 million for the Mississippi River-Gulf outlet. Proposed Engineer flood-control projects cover a wide range.

Requirements imposed on local interests in connection with some of these projects would add sizable amounts to the total construction cost—particularly for port facilities. On the $30-million proposal for the Hudson River, for example, local interests are to build a bulkhead and furnish storage and handling facilities for cargo, as well as dredge approaches and ship docks at the piers. For the proposed Mississippi River outlet to the Gulf of Mexico, local participants are to relocate highways and utilities.

• Benefit-cost ratio—Some of the proposed projects will be open to close questioning on Capitol Hill—particularly on the basis of economics. Five of the rivers and harbors projects on the 1954 list, for example, were considered dubious by the Jones Subcommittee on Civil Works of the House in its report of Dec. 5, 1952.

On the flood control list, the proposed $42-million project—to build two reservoirs and protection works at 10 localities on the Kansas River and its tributaries—is headed for a storm of controversy. Congress again will go through the floodway vs. reservoir battle stirred up anew by the recent report of three consultants to the Kansas legislature criticizing the Army Engineer flood control program for the basin and recommending a much cheaper flow-way plan (ENR Mar. 5, p. 21, June 18, p. 25).

Economic justification for these projects is boiled down to the benefit-cost ratio shown in the tables. The ratio represents estimated monetary value of benefits in relation to estimated cost of construction—as reported by the Army Engineers and the Department of Agriculture.

A ratio greater than 1 (one) indi-

TABLE I—FLOOD CONTROL—ARMY ENGINEERS

(Projects eligible for Congressional authorization)

Project	Cost	Benefit-Cost Ratio
Susquehanna River, vicinity of Endicott and Johnson City, N. Y. (Levees)	$3,812,000	0.71
Brazos River and tributaries, Texas (Modification of Belton reservoir for power; six new reservoirs)	122,584,000	1.44
Arkansas River, Holla Bend Bottom, Ark. (Levee, drainage, culvert construction)	252,000	1.05
Arkansas River, Conway County (Diversion channel, levees)	166,600	1.03
Arkansas River and tributaries, Enid, Okla. (Diversion canal, levees)	725,000	1.18
Mississippi River and tributaries, Vicksburg-Yazoo area (Modification of project adopted in 1946)	2,080,000	
New Madrid floodway, Mo. (Levee gap closure, construction of floodgate)	1,556,000	2.4
Chariton River, Iowa, Mo. (Works at Mystic, Iowa; reservoir construction)	14,583,640	1.52
Osage River and tributaries, Mo., Kan. (Eight new reservoirs instead of Osceola and So. Grand projects and revised Pomme De Terre reservoir; plus two local protection works)	137,694,000	1.13
Kansas River and tributaries, Neb., Kan. (Two reservoirs, ten local protection projects, and improvement and drainage of Stonehouse Creek)	41,805,000	1.20
Little Missouri River, Marmarth, N. D. (Levee system)	150,000	1.6
Coal Creek and tributaries, Tenn. (Channel work)	660,000	1.24
Sandy Lick Creek, Reynoldsville, Pa. (Channel improvement)	483,000	1.21
Little Calumet River and tributaries, Ill., Ind. (Enlargement of Glumet-Union drainage ditch and connections)	434,300	1.66
Gold Creek and tributaries, Alaska (Channel improvement)	311,000	2.59
Wailoa Stream and tributaries, Hawaii (Diversion dike and channel; improving channel embankments)	270,000	1.13

TABLE II—FLOOD CONTROL—DEPARTMENT OF AGRICULTURE

(These upstream flood control programs, eligible for Congressional authorization, have been surveyed by the Department of Agriculture. The programs are for retarding runoff and waterflow and for preventing soil erosion.)

Location	Cost	Benefit-Cost Ratio
Delaware River, N. Y., Pa., N. J.	$64,382,000	1.72
PeeDee River, Va., N. C. and S. C.	20,660,000	5.0
Savannah River, N. C., S. C. and Ga.	21,009,000	1.31
Brazos River, Texas	109,065,000	2.28
Pecos River, N. Mex. and Texas	20,125,000	3.0
Grand (Neosho) River, Ark., Kans., Mo.	83,838,000	1.6
SNY Watershed, Ill.	9,793,000	3.59
Green River, Ky. and Tenn.	86,601,000	1.7
Scioto River, Ohio	20,307,000	3.4
Youghiogheny River, Pa., Md., W. Va.	8,852,000	1.87
Queen Creek, Ariz.	1,347,000	2.1
Sevier Lake, Utah	14,850,000	1.9

TABLE III—RIVERS AND HARBORS

(Major projects eligible for Congressional authorization)

Project	Cost	Benefit-Cost Ratio
Portsmouth Harbor and Piscataqua River, Me., N. H. (Rock removal)	$834,000	1.4
Weymouth Fore River, Mass. (Dredging, rock removal)	3,412,055	
Town River, Quincy, Mass. (Dredging)	450,000	4.6
Sakonnet Harbor, R. I. (Breakwater extension, dredging)	465,800	2.12
Patchogue River, Conn. (Dredging, jetty construction)	120,000	2.4
Hudson River, N. Y. (Dredging, rock removal, turning basin and two anchorage areas)	30,700,000	1.5
Hackensack River, N. J. (Dredging, turning basin)	1,463,000	1.46
Shoal Harbor and Compton Creek, N. J. (Dredging)	105,000	1.49
Mispillion River, Del.	414,000	1.72
Ocean City Harbor and Inlet and Sinepuxent Bay, Md. (Dredging and raising jetty)	658,000	1.22
Pocomoke River, Md. (Dredging, dike construction)	540,000	1.4
Nanticoke River, Bivalve, Md. (Dredging, jetty construction)	180,000	1.2
Channel from Port Royal Sound to Beaufort, S. C. (Dredging)	600,000	1.2
Savannah Harbor, Ga. (Dredging)	414,900	1.28
Channel across St. George Island, Fla. (Dredging, jetty)	426,700	1.23
St. Joseph Bay, Fla. (Dredging three channels)	1,125,000	1.05
Mobile Harbor, Ala. (Dredging)	5,778,000	2.93
Mississippi River-Gulf Outlet (Dredging 70-mile land and water cut; constructing jetties)	80,000,000	1.45
Atchafalaya River, Morgan City, La. (Dredging)	440,000	1.20
Port Aransas-Corpus Christi Waterway, Tex. (Dredging)	795,000	2.6
Sheboygan Harbor, Wis. (Dredging)	199,100	
Chicago River, Ill.	776,000	1.66
Crooked and Indian rivers, Mich. (Removing shoals, dredging, jetties)	150,850	1.4
Toledo Harbor, Ohio (Removal of dike)	420,000	1.8
Oswego Harbor, N. Y. (Breakwater extension, removal of shoals)	1,811,000	1.09
Los Angeles and Long Beach Harbor, Calif. (Dredging)	896,500	2.2
Columbia River between Chinook, Wash., and head of San Island (Dredging, extension of breakwater)	196,200	1.81
Shilshole Bay, Wash. (Breakwater construction, dredging)	3,041,980	1.40
Bellingham Harbor, Wash. (Dredging, breakwater)	1,224,300	1.64
Everett Harbor and Snohomish River, Wash. (Dredging, dike construction)	325,970	1.51
Quillayute River, Wash. (Dredging, raising jetty)	375,000	1.28
Port Angeles Harbor, Wash. (Dredging, breakwater)	412,460	1.58
Honolulu Harbor, Hawaii (Construct new entrance channel, install drawbridge)	2,380,000	1.11

cates that the estimated benefits have a monetary value larger than the cost of the project—and that the project is economically sound. Methods of calculating both benefits and costs have been a subject of long controversy inside and outside of Congress.

Committees of the House and Senate will have to decide how much attention should be paid to the recommendations of the Jones subcommittee (ENR Dec. 18, 1952, p. 21). The Jones group called for closer congressional control of Army Engineer civil works. George A. Dondero, Michigan Republican who heads the House committee, referred the Jones reports last April to the two subcommittees on flood control and on rivers and harbors.

Nothing has been heard of the findings or recommendations since then. And no committee action has been announced on proposed legislation that would put all federal agencies that build natural resource projects under strict surveillance of Congress.

- **May set new standards**—Should the House Public Works Committee adopt the suggestions of the Jones subcommittee, next year's authorization bill would be drastically affected. It might become the vehicle for legislation setting up new standards and controls for civil works projects of the federal government.

By custom, civil works authorization bills originate in the House. Then the Senate takes them up and usually adds projects to the approved list. The questionable projects often get more consideration in the Senate; it's the old story of "you vote for my project and I'll vote for yours."

Nothing now in sight makes it likely that this process will be changed much in 1954. The bill looks safe for a majority of the projects proposed by the Army Engineers.

But the public works committees may balk on the agricultural flood-control programs. After President Eisenhower sent his July 31 resources message to Congress, emphasizing upstream flood control, the agriculture committee chairman of both houses introduced identical Administration bills that would put this work under their committees. That legislation may block upstream programs now slated for the civil works authorization bill, as provided by the 1936 Flood Control Act.

Agriculture has received only one previous authorization for upstream flood control. That was in the 1944 Flood Control Act—for 11 basins then estimated to cost $91 million but now revised upward to more than $175 million. There are bigger stakes in agriculture's future planning.

Plastic pipe

New England waterworks group devotes session to manufacture and use

Plastic pipe is growing fast as an industry; it is growing, too, in its interest for waterworks men.

These conclusions emerged from discussions on manufacture and use of the new material at the 72nd annual New England Water Works Assn. convention in Poland Spring, Me., last week.

Brigham Britton, president of Carlon Products, Cleveland, told the meeting that 20% of all pipe now made in sizes up to 2 in. is plastic. Allen Symonds, formerly with American Water Works Service Co. and now of General Engineering & Construction Co., Boston, told of his former firm's experience with plastic service connections, now totaling 2,150.

Through this extensive (but still experimental) use there have been no failures, no troubles with bronze adapters, some troubles with light bands for clamping to adapters. Stainless steel is now used (and use of Dresser-type couplings was suggested from the floor).

Symonds pointed out that plastic pipe requires careful laying; it must not be used for hot water systems and it becomes brittle at a colder temperature than 20 F. But for normal service line use, where it compares favorably costwise with copper tubing, he suggested that experimental installations be made by waterworks men in areas of their systems subject to pressures of 100 psi or less.

Britton said there were some 30 others in the plastic pipe business besides his firm, and that the now small number of raw-plastics producers is due to grow. (See "Plastic pipe: What's its future?" in ENR May 7, 1953, p. 37.)

• New blood needed—In his presidential address at the convention's closing dinner, ex-New Englander Stanley M. Dore, now deputy chief engineer of New York City's Board of Water Supply, let a humorous talk carry a serious message. His advice to waterworks men: "Foster careers, don't just fill jobs."

Referring to the salary problem plus the preoccupation with security which he finds in younger men, Dore expressed the need for young men in waterworks positions.

• New problems faced—Water suppliers were warned by Malcolm Pirnie, consultant of New York, regarding problems from new pollutants.

ENR photo by Compton

STANLEY M. DORE—"The future rests with the young."

"In spite of progress, we don't know all the answers. We must be vigilant," he said. And he cited the following as instances of pollutants of concern to industrial as well as domestic water suppliers: radioactive "fallout," fission products from Nevada bomb tests that have been detected in Massachusetts reservoirs; household detergents (a curse also in sewage treatment) that have been found to go through waterworks, causing lime, coagulants and turbidity that go through settling basins and reduce filter runs; weed killers on watersheds; accidental industrial waste spills; unexplained medicinal tastes.

Public Roads Bureau combines two divisions

Two departments of the Bureau of Public Roads have been consolidated and placed under the direction of Arthur C. Clark, deputy commissioner. He is now in charge of the new division of engineering, which combines the functions of the former construction and maintenance and programs and design divisions.

The death of Harold E. Hilts (ENR Sept. 24, p. 52) brought about the consolidation of the two divisions earlier than planned. Before the recent BPR management survey was started (ENR Sept. 3, p. 21), Commissioner Francis V. du Pont had decided to unite the two divisions upon the occasion of Hilts' planned retirement later this year.

Clark has two able assistants to handle operating details, giving him more time for overall problems. His long-time assistant, Morley B. Christenson, will be in direct charge of construction and maintenance. Joseph Barnett, formerly chief of the urban roads division, is now the deputy commissioner's assistant for programs and design.

Toll road planning

A Chicago-Gulf turnpike proposal is taken up by five-state commission

Governors and their representatives from five states have set up a Lake-Gulf highway planning commission with the object of integrating planned and future toll road routes to form a north-south turnpike that upon completion will extend from Chicago to the Gulf of Mexico.

At a meeting last week at Kentucky Lake State Park, the group—Governors of Kentucky, Indiana, Tennessee and representatives from Georgia, Florida—announced tentative plans for the integrated superhighway.

The expressway would begin near the Chicago area in Indiana, extend through the Louisville area, through Tennessee, Georgia and into Florida. Each participating state will select its own method of financing, location and type of road.

A study committee was set up to integrate existing traffic studies and determine the best location for the expressway. William P. Curlin, Kentucky highway commissioner was named temporary chairman. Other members are Albert J. Wedeking, chairman of the Indiana Highway Department and recently appointed general manager of Indiana's toll road commission; W. M. Leech, Tennessee highway commissioner; Dixon Oxford, member of the Georgia Highway Board, and Earl P. Powers, chairman of the Florida Turnpike Authority.

Indiana is well along on plans for an east-west turnpike to connect Southbend with suburban Chicago. Construction is expected to begin early next year.

Kentucky's Gov. Lawrence Wetherby wants Indiana to build a north-south offshoot to tie in with a 40-mi toll highway that his state is planning to build between Louisville and Elizabethtown.

Although taking an interest in the concept of a north-south arterial route and willing to participate in future deliberations, representatives of Tennessee and Georgia indicated that they are not at present favorable to the toll road idea.

Tennessee's Gov. Frank Clement, who campaigned against toll roads in last year's election, said his state's contribution to the proposed turnpike likely would be in the nature of widening and improving existing north-south routes.

Florida, of course, is already in the toll road fold, with a route study under way of the projected 110-mi Miami to Ft. Pierce turnpike.

U.S. engineers urged to present papers for 1955 Paris congress on large dams

Carl P. Vetter, chairman of the U. S. Committee of the International Commission on Large Dams (I.C.O. L.D.) has issued a call to U. S. engineers to begin the preparation of papers that can be presented at the Fifth Congress to be held in Paris in 1955. Deadline for receipt of papers to be considered by the U. S. committee has been scheduled for April 30, 1954.

Mr. Vetter points out that "it is important to our prestige that the United States, the greatest builder of large dams all over the globe be fully represented in the form of papers at the Fifth Congress." It is also pertinent to note that an American, Gail Hathaway, is the new president of I.C.O.L.D., succeeding Andre Coyne of France.

Prospective authors should communicate with Mr. Vetter at Post Office Box A-A, Boulder City, Nev., on procedures for preparation and submission of papers.

The executive committee of I.C.O. L.D. met in Paris, Sept. 11, to make final plans for the meeting and to discuss further the four subjects to which all papers for the Fifth Congress should be directed. These subjects are as follows:

(1) Design and construction of dams on permeable soils and methods of foundation treatment.

(2) Economics and safety of different types of concrete dams.

(3) Settlement of dams due to compressibility of the dam's material or of the foundation soil; including earthquake problems.

(4) The relation of the cement content of the concrete to performance of gravity, arch, and buttress dams, and its influence on permeability and frost resistance.

As distinct from formal papers, "communications", i. e. discussions, may be submitted on new developments (since the New Delhi Congress in 1950) in methods for determining the maximum flood discharge and in the field of sedimentation in reservoirs. In addition, the U. S. committee is soliciting answers to a questionnaire on the subject of "tests of small-scale models of dams, including their construction and study of stresses and deformations."

L. A. Times photo

A LOS ANGELES BRIDGE was put out of commission last week by fire of undetermined origin that caused $180,000 damage by destroying one of its two 240-ft steel and timber approaches. The $1.1-million span over the Los Angeles River at Rosecrans Ave. has a 600-ft reinforced concrete and steel center portion, which was designed to be a permanent bridge over a flood control channel to be built by the Army Engineers. The approaches were to be salvaged when the channel is built and the rest of the river bed filled in. A temporary detour has been built over the dry river bed pending a decision on rebuilding.

Ohio studies measures to boost water supply

Ohio's Department of Natural Resources last week began investigation measures to improve the state's water supply as 15 to 20 large communities and even more villages continued to suffer from a prolonged drought.

Search for a long-term solution of the problem was sparked by Gov. Frank J. Lausche, who recently asked Ohio water authorities to consider the possibility of either piping water from Lake Erie and/or the Ohio River or building reservoirs in the upper reaches of both watersheds (ENR Oct. 1, p. 17.)

Tapping Lake Erie already has been given some study and this part of the governor's recommendation is receiving immediate attention. C. V. Youngquist, chief of the state water division, has embarked on a study of available data.

Meantime, another aspect of the water shortage came to light when it was learned that the Atomic Energy Commission has had to modify water supply plans for its huge Pike County plant.

That county was chosen for the AEC plant after careful study of water available there. But with the Scioto River now at a near record low flow, Youngquist has been quoted as claiming that the atom plant will have to treat its 40-mgd take from the stream more intensively than first planned. Low flow means concentrated pollutants and proportionately greater algae growths.

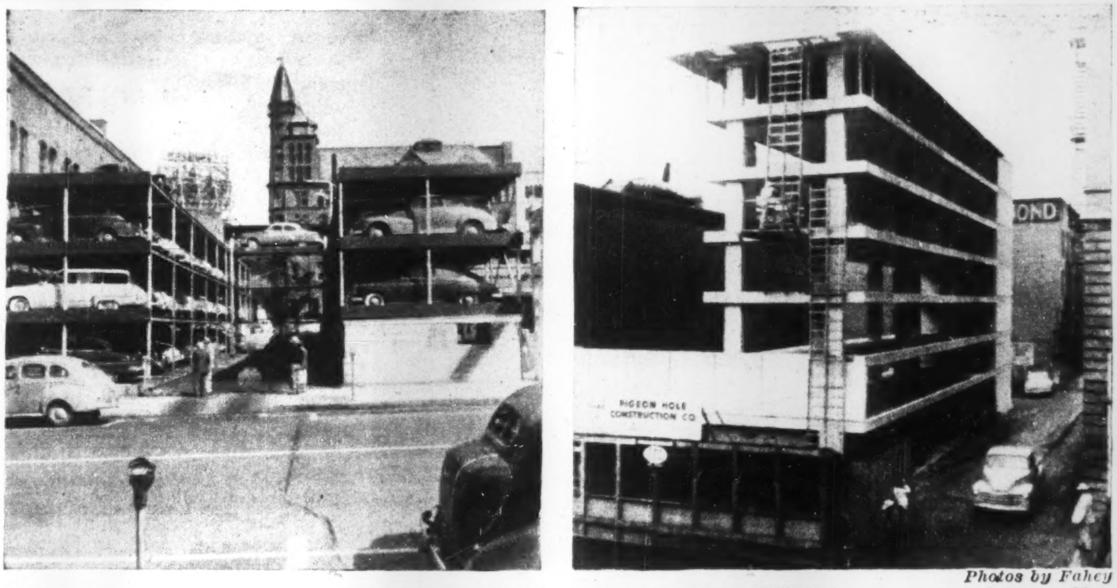
Manhattan to get new $25-million skyscraper

A 30-story, $25-million skyscraper will rise in Manhattan's downtown financial district—the first such structure to be erected in this area in over 20 years. Tentative plans call for a 1956 completion date.

The new office building (designed by architect William Lescaze to provide 1,000,000 sq ft of space) will replace a 69-year-old landmark—the New York Produce Exchange Building on Broadway and Bowling Green. Plans for the deal were made public when Jack D. Weiler of New York City and Benjamin Swig of San Francisco, realty investors, signed a long lease on the property.

Texas turnpike

The new Texas Turnpike Authority, which will build the proposed $30-million Dallas-Fort Worth toll road, has decided to seek a court test of its enabling legislation and a validation of the revenue bonds to be issued.



Photos by Fahey

FIRST PIGEON HOLE PARKING GARAGE (left), built in Spokane, Wash., in 1950, had a structural steel frame. New garage in Spokane has a cast-in-place concrete frame (right). Now the developers are considering precasting.

Precast concrete considered for parking structures

The Pigeon Hole Parking Co., of Spokane, Wash., is now studying the possibility of building its structures of prestressed, precast concrete.

Of 26 Pigeon Hole garages operating or abuilding in the U. S., only three—in Spokane, Reno, Nev., and Los Angeles—have structural frames of cast-in-place concrete. The 88-car Spokane and 254-car Los Angeles garages opened in September. (The Los Angeles garage is a lift-slab job.) Reno's is just getting started.

Steel racks, bolted together to be demountable, have been used for the other 23 garages. Pigeon Hole parking garages consist of two multi-story rows of stalls separated by a space in which an elevator operates. Cars are driven onto the elevator, then moved vertically and horizontally into an assigned stall.

Conventional poured concrete pigeon-hole garages take from six to nine weeks longer to build than a steel one, the constructors report. Per stall, concrete costs about $800, steel from $750 to $775. Once poured, however, concrete requires little maintenance, say officials of the Pigeon Hole Parking Co. Consequently, initial cost need not be a controlling factor in deciding between steel and concrete framing.

With prestressed concrete, the fire hazard is similar to that of enclosed parking garages and the construction cost much less, concludes the Pigeon Hole firm. For example, where cost of a 300-car Pigeon Hole Parking unit might be $150,000, it would be perhaps $600,000 for a 300-car ramp garage.

The company also is developing a new elevator with a revolving turntable that will make possible the parking of cars two deep and it will handle them faster.

Work begins at Monticello Dam site

Work on Monticello Dam, main unit of the $46-million Bureau of Reclamation Solano project, got under way last week at a ceremony at which California's Gov. Earl Warren emphasized the state's continued need for water conservation projects by noting a 400,000 increase in population thus far this year.

Initial work involves construction of a road to detour traffic around the Monticello Dam site. Then the contractors, Peter Kiewit and Sons of San Francisco and Parrish Brothers of Benicia, Calif., will go to work on the dam. Their $7.6-million contract was awarded by Secretary of the Interior Douglas McKay in August.

It will be a thin arch concrete dam with a "glory hole" spillway. The dam will be 295 ft high at the maximum section and 1,000 ft long at the crest. Systems of imbedded pipe will be provided for artificially cooling the concrete and for grouting the joints. Outlet works will consist of two 90-in. dia. pipes through the dam, controlled by means of two 54-in. hollow jet valves.

The "glory hole" spillway will have an uncontrolled entrance of 72 ft in dia., leading to a 28-ft dia. discharge tunnel. The reservoir created by Monticello Dam will have a storage capacity of 1,600,000 acre-ft. This will provide a firm yield of 263,000 acre-ft.

Engineering details for the diversion dam, which will be located six miles below Monticello Dam and will serve to divert water into Putah South Canal, have not been completed at the present time.

Putah South Canal will be approximately 35 mi. long and will have a capacity of 956 cfs at its head and will end near Cordelia with a capacity of 115 cfs.

Additional contracts will be let for these works as engineering is completed and as necessary funds become available.

Flood control project

Construction started on a $6.7-million flood control dam on Sinnemahoning Creek on the main tributary of the west branch of the Susquehanna River in north central Pennsylvania. Contractor for the 170-ft high earth and rock structure is the Nello L. Teer Co., Durham, N. C.

A FLEET OF SCRAPERS carried 20-cu-yd payloads at a 40-mph clip from borrow area to the dam site a mile away, making round trips in about nine minutes. To achieve loading in 45 seconds, scrapers were pushed with large crawler tractors equipped with bulldozers. In rough going, tractors teamed up in tandem behind scrapers.

New Rio Grande flood and silt control project near Albuquerque is completed

The last load of dirt has been dumped on $4.5-million Jemez Canyon Dam, an earthen flood and silt-control barrier stretching across New Mexico's Jemez Creek 22 miles northwest of Albuquerque, N. M. An Army Engineer project, it is part of the comprehensive Middle Rio Grande flood control and reclamation program authorized by Congress.

Rising 135 ft above the stream bed, the new dam is 820 ft long and contains 1,092,000 cu yds of earth. It is located just 2 mi. above the confluence of 65-mi long Jemez Creek with the Rio Grande.

Upstream from the dam stretches a 5-mi reservoir area of 120,000 acre ft capacity to impound flood waters and silt of Jemez Creek—73,000 acre ft for flood waters, 47,000 acre ft for sedimentation.

Discharge of flood waters at the dam is controlled by a gate housed in an intake tower behind the dam. Discharge is through a 13-ft concrete conduit running under the dam at its base, into a stilling basin on the downstream side, and on into the stream bed.

The dam is protected from overspilling by an uncontrolled, off-channel spillway about a mile south of the dam. This spillway was constructed in a natural "saddle" in the hills and lies on the south side of the mesa which forms the south bank of Jemez Canyon. Spillway consists of a natural channel leading to a 400-ft concrete weir which is 5 ft lower than the top of the dam a mile away. The weir has a maximum flow capacity of 114,000 cfs. It is protected on both upstream and downstream sides, upstream by rock facing, below by derrick stone rip-rap.

Upstream from the dam, about 4½ mi, a 2600-ft earth levee has been constructed along the reservoir shore to keep impounded waters from overrunning Santa Ana Indian Pueblo, on the banks of the Jemez. Construction includes two diversion ditches behind the pueblo to keep surface drainage from piling up behind the new levee.

Jemez Dam's function in controlling floods on Rio Grande is twofold: to impound Jemez floodwaters, preventing them from adding to heavy runoff in the Rio Grande, and to remove silt which is a major factor in Rio Grande flooding. Peak measured flows on Jemez Creek were 15,300 cfs in October, 1944, and 12,400 cfs in August, 1945. Both flows caused major levee breaks on the Rio Grande, which begins to undercut its levees in the Middle Valley any time there is a sustained flow in excess of 5,000 cfs in its channel.

Sedimentation from heavy loads of silt carried by the Rio Grande causes its channel to rise about 4 in. a year. Now in many places in Middle Valley the stream bed is higher than the valley floor. This is true at Albuquerque where any excessive stream flow constitutes a major threat to the heart of the city. Jemez Dam will remove silt from Jemez Creek for the next 50 years, helping to reduce sedimentation in the Rio Grande. Discharge of silt-free water from Jemez Dam will, in turn, tend to clean the Rio channel as the clear water scours and picks up silt to carry it on downstream.

There's no recreation factor involved in Jemez Dam. It will be emptied as soon as practicable after any flood. Engineers expect it to be empty about 70% of the time.

Hinman Brothers, Denver, were contractors on construction of the dam and spillway. The contract was for $1,583,557.

The spillway was used as a borrow area for dirt which went into the dam. Hinman moved the earth with six 15½-yd scrapers, which hauled about 8,000 yds a day when working on the dam fill, and more than 12,000 yds a day when handling material to be wasted. Scrapers traveled more than 100,000 miles on the job. There was a second borrow area upstream in the reservoir area.

Impervious dam core is of clay, compacted by a tractor-drawn pneumatic-tired 50-ton roller.

Morrison-Knudson Co., Los Angeles, constructed the intake tower, conduit and stilling basin on a $1.1-million contract, on which work was completed in April, 1952.

Other Mid-Rio projects

Status of other projects in the Middle Rio Grande flood control and reclamation program is as follows:

Chamita Dam on the Chama River near Espanola, and Bluewater floodway near Grants—both in the planning stage.

Improvement of Rio Grande levees—now in progress.

Channelization of Rio Grande through San Marcial swamps—being completed under Bureau of Reclamation.

Operation of Middle Rio Grande Conservancy District by Bureau of Reclamation—contract approved, transfer of control awaiting appropriations.

Colorado orders study of mountain tunnel

Two consulting engineer firms have been engaged by the Colorado Highway Department to study the feasibility of a toll tunnel under the Continental Divide, linking the state's eastern and western slopes.

The study will be made by Ole Singstad of the New York firm of Singstad & Baillie and by Howard, Needles, Tammen & Bergendoff, Kansas City. An important basis for their analysis will be engineering studies made in recent months by the state highway engineers.

More architects engaged in '52

Their new projects in heavy construction are up 18% in dollar volume

ARCHITECT AND ARCHITECT-ENGINEER NEW BUSINESS IN 1952

Based on all firms with $100,000 or more new business, as reported by Engineering News-Record and Construction Daily

ype of work	All three groups					
	No. of architects		No. of projects		$ volume (millions)	
	1952	% change '51-'52	1952	% change '51-'52	1952	% change '51-'52
Heavy Construction						
Waterworks	75	+ **97**	34	+ **127**	8.5	+ **44**
Sewage	80	+ **63**	44	+ **76**	20.6	+ **222**
Bridges	21	+ **320**	9	+ **350**	2.5	− **81**
Highways	54	+ **4**	33	+ **94**	89.7	+ **2618**
Earthwork, waterways	22	− **4**	19	**0**	1.7	− **91**
Airports	183	+ **25**	305	+ 43	259.7	− **52**
Unclassified	204	+ **81**	179	− **18**	62.9	− **28**
Total	....	...	623	+ **22**	445.6	− **34**
Buildings						
Industrial	759	+ **27**	1042	− **4**	751.8	− **3**
Mass housing, commercial and public	2774	+ **16**	6904	+ **25**	7193.8	+ **27**
Total	....	...	7946	+ **20**	7945.6	+ **24**
All construction	3196	+ **14**	8569	+ **20**	8391.2	+ **18**

There was a 14% increase in the number of architects engaged in heavy construction work last year and the dollar volume of the projects they worked on was 18% greater than in 1951.

An ENGINEERING NEWS-RECORD survey shows that 3,196 architect and architect-engineer firms signed up $100,000 or more business in 1952. They were connected with some 8,569 heavy construction projects – 20% more than in '51–costing an estimated $8.4 billion.

Housing, commercial and public building accounted for the biggest part of all new business last year, with a total of 6,904 projects estimated to cost $7.2 billion. That was a 25% increase in the number of projects and a 27% gain in dollar volume. Working on these categories of construction were 16% more firms.

• **AEC made big difference**–However, the sharp increase in the dollar volume of building projects can be attributed entirely to atomic energy work, which in 1952 amounted to $2.1 billion. Otherwise, the dollar volume would have been 9% below 1951.

Industrial building remained a big source of the profession's 1952 fees, and there was a 27% increase in the number of architects and architect engineers taking on these jobs. A 4% drop in the number of projects and a 3% decline in their dollar value reflected the shift from heavy industry expansion for defense to demand for non-defense manufacturing facilities.

Highway, waterworks and sewerage programs also were a source of more work for architect-engineer combinations. Thirty-three new highway projects costing an estimated $90 million meant a 25-fold increase in work for architects. Toll road projects are responsible for this gain.

There were 25% more firms taking on airport jobs in 1952 and they handled 43% more projects. But, dollar volume of projects fell off by 52% as new military airbase construction declined in favor of expansion of existing facilities.

Bridge construction drew upon more architects in '52 but dollar volume was off. Fewer architects were engaged in earthwork and waterway projects. But, of course, these fields require relatively little architect service anyway.

The number of architects working on unclassified construction in '52 increased 81% over '51 but there were fewer projects to go around and their dollar volume was off 28%.

• **Big year in Texas**–Texas was the state where architects were busiest last year, with 341 handling jobs there as compared with 270 in '51. The number working on projects in California totaled 310 as compared with 281 the previous year; in Pennsylvania, 286 as compared with 246.

Previous ENR surveys have shown a marked increase in the number of consulting engineers and contractors in heavy construction. There was a 20% increase in the number of consulting engineering firms handling $100,000 or more business in 1952, boosting their total to 1,564 (ENR Sept. 10, p. 21). They worked on 5,901 projects in 1952, an increase of 36% over 1951. And, the dollar volume of these projects was $8.2 billion or 58% over 1951.

There was a 10% increase in contractors doing $100,000 worth of business or more in 1952, bringing their number to 7,420. They took on 15,380 new jobs, 11% more than in 1951, for a total dollar volume of nearly $10.7 billion, a 12% gain over 1951 (ENR July 2, p. 70).

ARCHITECT AND ARCHITECT-ENGINEER NEW BUSINESS IN 1952—BY SIZE OF FIRM (VOLUME OF NEW BUSINESS)

Type of work	1 — $1,000,000 or more						2 — $500,000-$1,000,000						3 — $100,000-$500,000					
	No. of architects		No. of projects		$ volume (millions)		No. of architects		No. of projects		$ volume (millions)		No. of architects		No. of projects		$ volume (millions)	
	1952	% change '51-'52	1952	% change '51-'52	1952	% change '51-'52	1952	% change '51-'52	1952	% change '51-'52	1952	% change '51-'52	1952	% change '51-'52	1952	% change '51-'52	1952	% change '51-'52
Heavy Construction																		
Waterworks	61	+ **74**	30	+ **150**	7.8	+ **59**	5	+ **400**	2	+ **100**	0.4	− **20**	9	+ **350**	2	**0**	0.3	− **40**
Sewage	64	+ **60**	35	+ **106**	19.7	+ **418**	9	+ **125**	2	− **60**	0.1	− **17**	7	+ **40**	7	+ **133**	0.8	− **43**
Bridges	20	+ **300**	7	+ **250**	2.3	− **82**	1	**0**	2	**0**	0.2	**0**	0	**0**	0	**0**	0.0	**0**
Highways	45	− **6**	26	+ **73**	88.6	+ **2758**	4	+ **100**	4	+ **300**	0.8	+ **700**	5	+ **150**	3	+ **200**	0.3	+ **200**
Earthwork, waterways	14	− **26**	11	− **27**	1.0	− **95**	3	+ **50**	3	**0**	0.1	**0**	5	+ **150**	5	+ **400**	0.6	+ **100**
Airports	144	+ **25**	256	+ **45**	252.5	− **53**	12	+ **33**	17	+ **42**	2.8	− **30**	27	+ **23**	32	+ **28**	4.4	+ **22**
Unclassified	128	+ **60**	107	− **41**	51.4	− **36**	25	+ **67**	24	+ **50**	4.2	− **9**	51	+ **183**	48	+ **118**	7.3	+ **152**
Total	....	...	472	+ **13**	423.3	− **36**	....	...	54	+ **42**	8.6	− **18**	....	...	97	+ **80**	13.7	+ **56**
Buildings																		
Industrial	383	+ **67**	589	− **3**	666.8	− **3**	107	+ **2**	150	− **4**	38.8	− **5**	269	+ **2**	303	− **4**	46.2	− **10**
Mass housing, commercial and public	1396	+ **17**	5219	+ **28**	6561.0	+ **29**	621	+ **26**	924	+ **22**	393.5	+ **22**	757	+ **9**	761	+ **7**	239.3	+ **6**
Total	....	...	5808	+ **24**	7227.8	+ **25**	....	...	1074	+ **17**	432.3	+ **19**	....	...	1064	+ **4**	285.5	+ **3**
All construction	1488	+ **16**	6280	+ **23**	7651.1	+ **19**	663	+ **21**	1128	+ **18**	440.9	+ **18**	1045	+ **7**	1161	+ **8**	299.2	+ **4**

Trenton Dam

Dedication of Nebraska project is milestone in Missouri Basin program

Dedication of Trenton Dam across the Republican River in southwest Nebraska last week was another milestone in the Missouri Basin development program. Aside from providing flood control on a river that claimed 135 lives in 1935, the new dam will impound water for irrigation of 25,000 acres of farmland in the Frenchman Cambridge project.

A Bureau of Reclamation project, it was completed at a cost of $21.6 million—$3.2 million less than the original estimate. Work began in August 1949.

The earth-fill dam has a crest length of 8,400 ft and a maximum height of 145 ft.

The central portion of the dam embankment consists of impervious material moistened and compacted with tamping rollers. The upstream slope is protected by a layer of riprap placed over a layer of gravel. Downstream slope is seeded.

Canal outlet works consist of a 5-ft 6-in. dia. circular conduit extending from the intake structure to the gate chamber, and an 8-ft 2-in. dia. horseshoe conduits extending from the gate chamber to the control house and stilling well.

The spillway is an open channel type controlled by three automatically operated 42x30-ft counterweighted radial gates. Water discharges through a concrete chute, stilling basin, and an un-lined outlet extending to the river. Small discharges are provided for by two 6x7.5-ft orifices through the spillway crest and controlled by four 6x7.5-ft pressure gates.

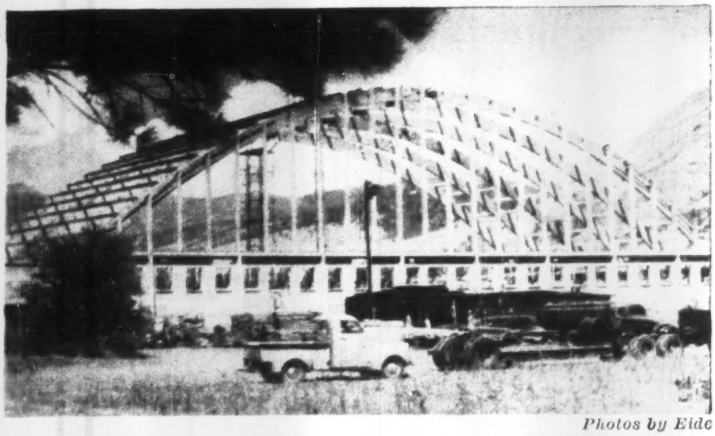
Included in the project was the relocation of the C. B. & Q. Railroad around the area, involving construction of 19 mi of new track and the erection of seven steel plate-girder bridges.

Second big merchandise center planned in N. Y. C.

Within the space of a week plans for two new merchandising centers on New York City's west side have been made public. The latest—sponsored by General Realty and Utilities Co.—proposes a 9-story building which will occupy nearly the entire block that is bounded by W. 43rd and W. 44th Streets, Eleventh and Twelfth Avenues.

A few days earlier, Webb & Knapp, Inc., revealed plans for a 20-story, $100-million merchandise mart to be erected over part of the Pennsylvania Railroad tracks (ENR Oct. 1, 1953, p. 26). Just west of the railroad's big terminal station.

In announcing plans for this second new merchandising-commercial center, Edmund F. Wagner, president of General Realty, reports that he is working toward a possible mid-1955 occupancy. The building (1,000,000 sq ft of rentable space) was especially designed by architect Sidney Goldstone for companies requiring large unobstructed areas for receiving, processing and distribution of merchandise in large lots.



Photos by Eide

General construction view of fieldhouse job with six arches in place.

Laminated timber arches span 207 ft

Ten laminated, three-hinged timber arches erected for a $680,000-fieldhouse for Montana State University at Missoula span 240 ft, probably setting a record for timber arch spans.

Use of the laminated arches saved $12,000 in comparison with steel and also is reported to make possible an annual insurance saving of 15 cents per each $100 of valuation.

Mounted on 30-ft piers, at 20-ft spacing, the arches rise 85 ft above floor level. Laminated from 2 x 12 timbers, they were fabricated in half-sections each 114 ft long around the arc and slightly more than 110 ft long, tip to tip. Each arch is 11 in. wide and 45 in. deep.

The arches, each section weighing six tons, were erected by a crane with a 96-ft boom. Only one such crane being available in the area, an 80-ft skid-mounted steel tower supported the crown end of one half-section on a hydraulic jack while the crane hoisted the second half-section into position.

With three arches in place, 4 x 12-in. purlins were placed on 6-ft, 7-in. centers. That spacing was chosen to make possible the use of commercial lengths of sheathing. Need for diagonal steel rod bracing was eliminated by placing the sheathing on a 26-deg. angle.

Laminated end-wall columns also were used, 5¼ x 21¼-in. in size, up to 60 ft long, placed on 8-ft centers.

The arches were fabricated by Timber Structures, Inc., at Portland, Ore., from designs prepared by Olsen & Kitchin, structural engineers of Seattle, for Architects Fred Brinkman and Percy Lennon of Kalispell, Mont. Hightower & Lubrecht Construction Co., of Missoula handled the general contract.

A 3¼-in. pin is used to connect hinges of the laminated wood arches.

Construction Costs: 1952-53

ANNUAL REPORT BY ENGINEERING NEWS-RECORD

Cost indexes 93, 358

ENR construction and building cost indexes; AGC; Aberthaw; Austin; Fruin-Colnon; Fuller; Turner; Marshall & Stevens; American Appraisal; US Engineers western states; Boeckh; ICC railroad; Handy-Whitman public utility; Bu of Reclamation irrigation & power; California bridge & highway; Bu of Public Roads highway; Pennsylvania highway; Minnesota highway; NY Port Authority hangar; Fick waterworks; Nelson refinery; building costs in 14 countries; Canadian construction (129).

Materials prices 123, 305

ENR 20-cities; New York City; Wholesale price index BLS; US possessions (117).

Wage rates 125

ENR 20-cities averages for common and skilled wages; for each of 20 cities; equipment operator wages; wages in 61 cities; New York City wages; BLS consumer price index; Canadian wage & cost of living changes; wages in 11 Canadian cities for 8 building trades; BLS union labor trends for 17 building trades; average wage rate increases in 85 cities; average union wage rates in building trades by region; average hourly earnings on contract construction.

Work injury rates 133

Compensation insurance base rates . . 137

Cost of financing construction . . . 139

Construction equipment rental rates and price indexes 143

Unit prices

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Teamwork on building cost estimating . 165

How school rentals are set 173

Highway landscaping costs 174

Water purification unit costs 178

How one state keeps school costs down 181

THE WIT who called ours the Paper Age would probably call the current economic struggle the Battle of the Indexes.

Battle it is getting to be and not without its casualties. Lower and lower bid prices in the face of still rising costs, lower wholesale prices while consumer prices continue to rise—these contradictions are setting up stresses and strains that bear close watching.

Materials prices, wage rates, equipment costs, unit prices, insurance costs and cost of construction financing are reported in the pages which follow.

But it is the indexes that show how the battle lines are drawn. Several appear in this annual roundup for the first time.

The good health and vigor of the construction industry depend upon how this cost-price battle is resolved. The signs and the symptoms are assembled in the pages which follow. The diagnosis and cure are in the hands of the engineers, architects and contractors who direct the destiny of this great industry.

'54 THE OUTLOOK FOR CONSTRUCTION COSTS

The cost rise is taking a breather this fall. But the most that should be counted on is a temporary pause, with relative stability at about current levels until spring when the next round of wage bargaining begins.

In the meantime, the round-up of cost and price movements in these pages offers an exceptional opportunity to size up the many factors that shape future construction costs. All point to a continuing rise in costs, but at a declining rate of increase.

Construction cost indexes—The Engineering News-Record Construction Cost Index for October is 610.8, 1.1 points below its all-time high in August. But the rate of rise has been running down all year. A year ago this index was 7.7% higher for the year. Today's index is up only 3.8% for the twelve months.

This slowdown can be seen also in the Petit Trend Recognition chart on the insert facing page 93. The evidence there indicates another leveling off period, but no promise of any sustained drop in costs.

The Building Cost Index is 436.3 for October, 0.8 points below its August peak. It is only 2.7% higher than a year ago. It had climbed 5.3% the year before.

Next year's cost rise should hold to 2% or less as measured by these indexes.

Contractor building price indexes—While the building cost index rose 2.8%, the building price indexes, which adjust for productivity, went up 1.6% on an average. This compares with a rise of 2.6% the year before.

Bid prices for heavy construction—A sharp drop in prices bid for highway construction in the second quarter of 1953 puts them down 2.3% for the Bureau of Public Roads composite mile, compared with a 6.4% rise a year ago. The most intense competition since the 1930s is behind this sharp bidding.

Wage rates and benefits—The construction trades wound up their 1953 bargaining with a 6.1% increase for common labor and 5.6% rise for skilled. These compare with 1952 gains of 10% and 7.4% respectively. Both include employer contributions for fringe benefits, which continued to make strong gains in labor contracts. The 1953 wage-increase pattern in more than half of the contracts was 10-15 cents an hour in the 20 cities covered by ENR, but increases granted ranged from 2 cents to 45.5 cents an hour.

Construction materials prices—All materials were up more this year than last, except lumber.

In the 20 cities covered by ENR price reporters, cement prices rose 4.3% in the 12 months ending October 1 as against 1.6% in the preceding 12 months. This year's structural steel price rise was 6.5% compared with 5.5% a year ago. Sand is up 4% this year, 0.9% last year, and common brick is up 3.1% compared with 1.6%. Ready-mix concrete is 5.8% higher, last year 3.7%; and structural clay tile prices are up 3.8% this year, only 1% last year. But lumber is down, fir 8.1% following last year's 2.4% price rise. Pine is down 2.3% this year following its 1.9% rise last year.

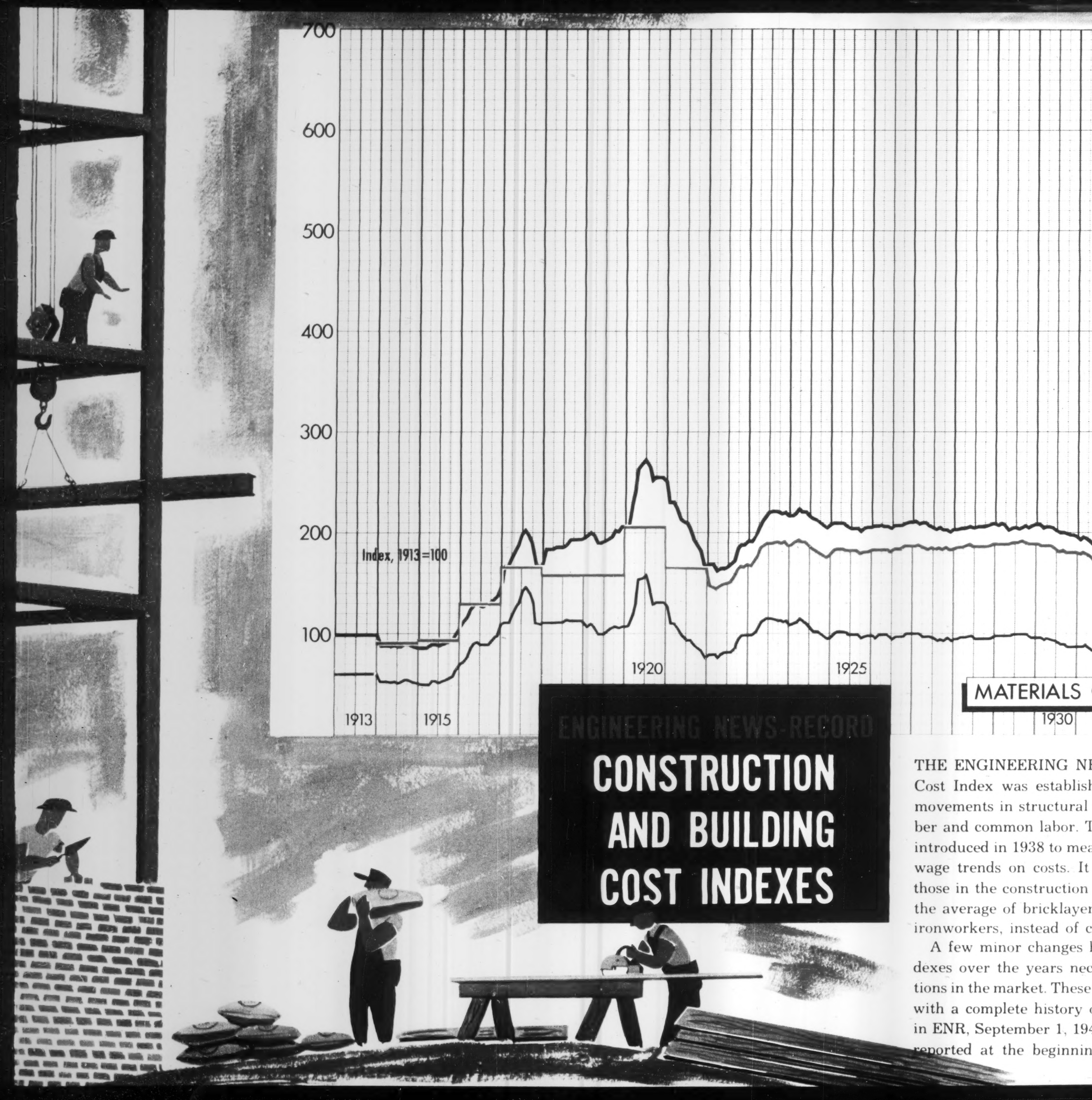
Wholesale prices of building materials set a new high in July, with an index of 121.3 on their 1947-49 base—up 3% for the year. Wholesale price trend for all commodities has been on the downgrade since topping out at 112.2 in August, 1952.

Construction equipment—Prices of construction machinery climbed 2.7% between January and July this year for an over-all increase of 19.2% since 1950. New rental rate averages compiled for informational purposes by the Associated Equipment Distributors are up from 17 to 24% for an average of around 19.5%.

Construction money rates took a sharp turn up this year with the change in policy at Washington. They reached a high at mid-year, then backed down slightly in August. They might ease a little more. State and municipal bonds topped out at a yield of 2.99% then eased off to 2.89. They went as low as 1.61 in February 1951. Industrials hit 3.32% and dropped back to 3.09.

Construction contract awards close to the activity peaks of the past two years are expected in 1954—more state and municipal construction, not quite so much federal and private. Back of this flow of contracts is the backlog of construction proposed, but not yet under contract, which now tops $73 billions and is still growing. Money is available in adequate supply to finance the current high rate of construction activity.

The construction outlook for 1954, thus, is good—high volume with only a moderate cost increase. And this is offset by high productivity and resulting bargain prices in a highly competitive market.



ENGINEERING NEWS-RECORD
CONSTRUCTION AND BUILDING COST INDEXES

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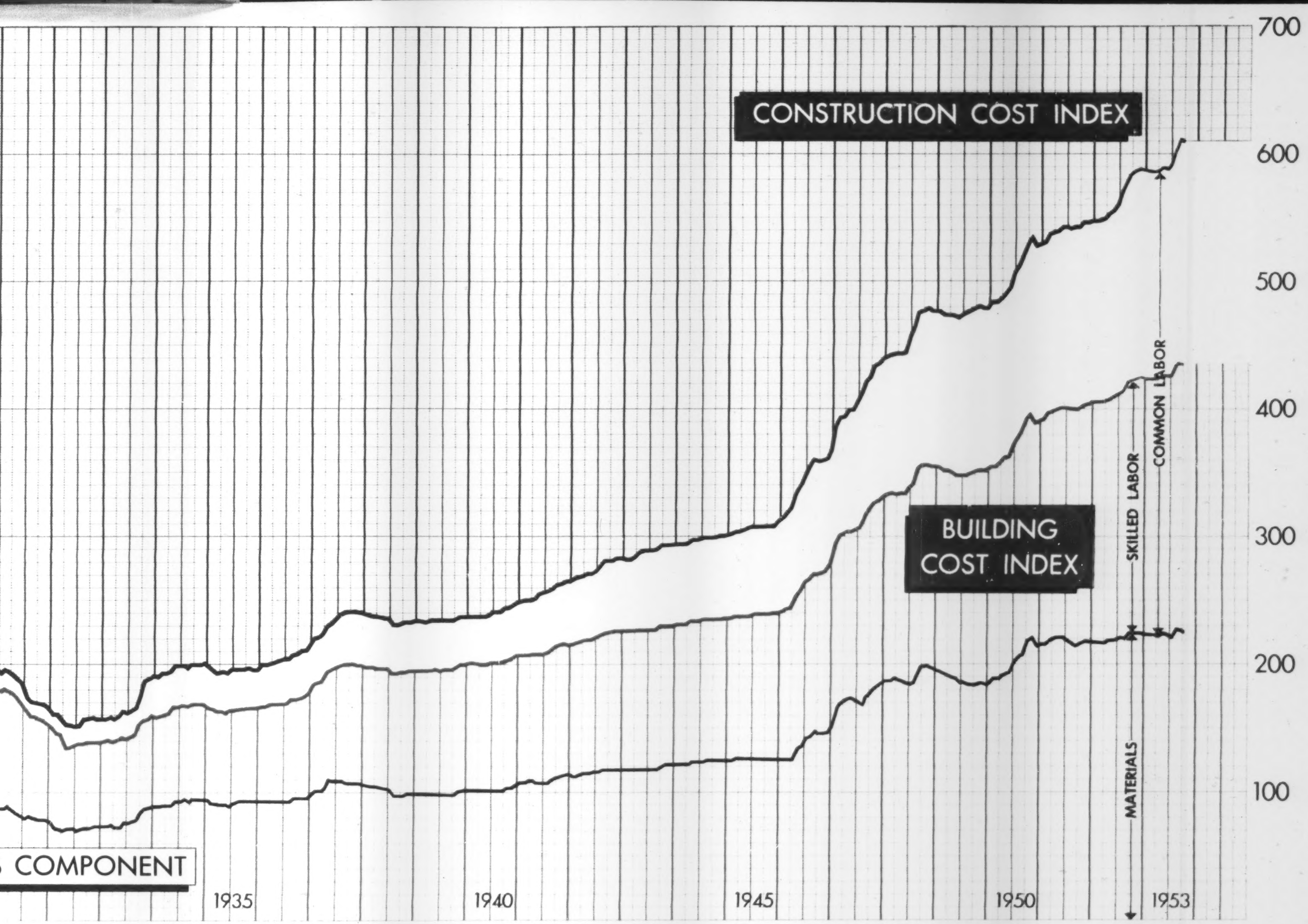

NEWS-RECORD Construction
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The Building Cost Index was
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It uses the same materials as
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common labor.

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ecessitated by changed condi-
se are recorded in full, together
of this development and use
949, page 398. New values are
ing of each month, based on

1913 = 100. These are weighted aggregative indexes, thus base years can be shifted at will.

ENR Construction and Building Cost Indexes reflect wage rate and material price trends. They do not adjust for labor or job efficiency, materials availability, competitive conditions, management, mechanization or other "intangibles" affecting construction costs.

A hypothetical block of construction requiring 6 bbls of cement, 1.088 M ft bm of lumber, 2,500 lbs of steel and 200 hours of common labor is used in the Construction Cost Index to measure the trend of the cost of heavy construction.

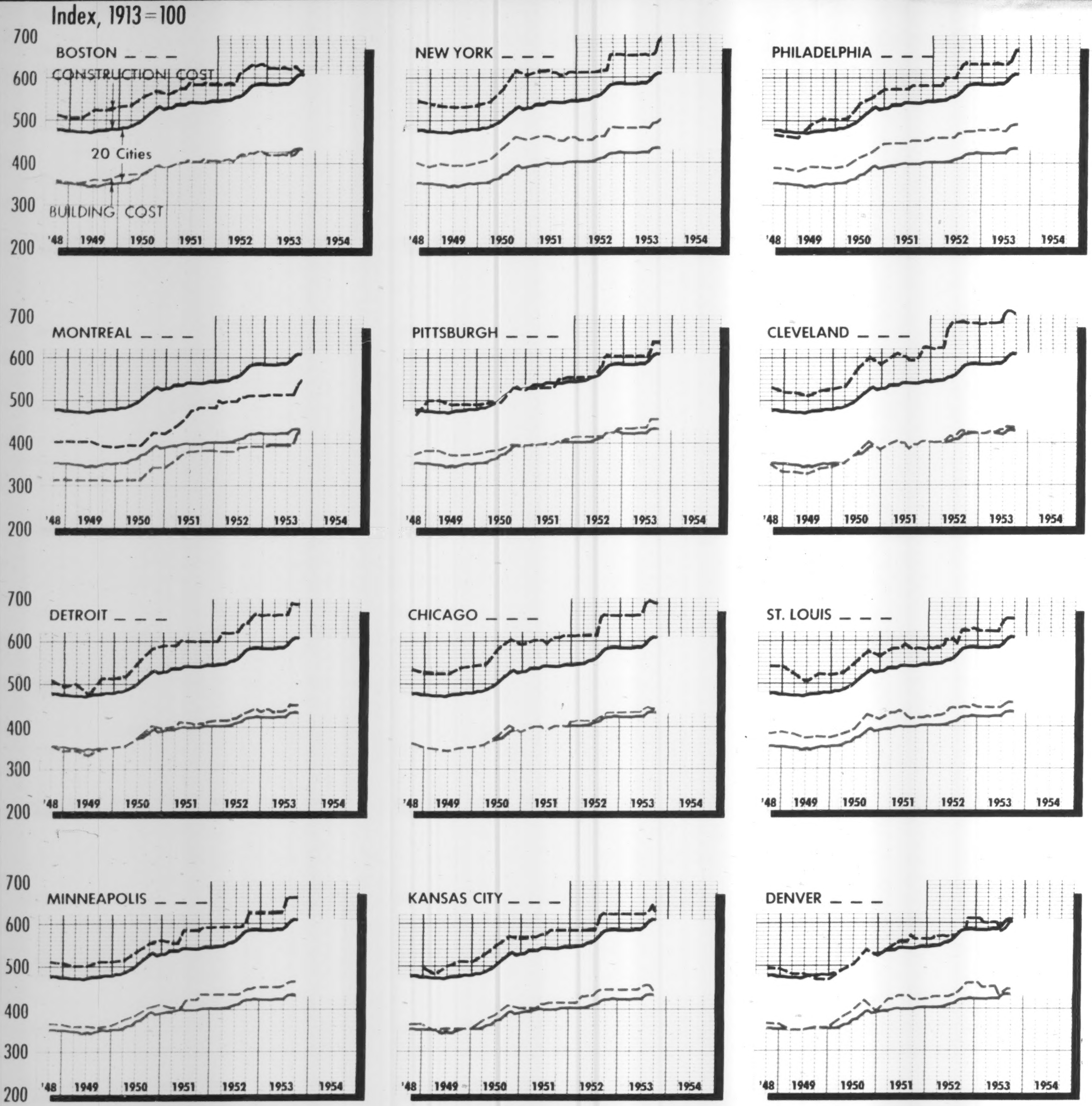
The Building Cost Index is based on a similar hypothetical block using the same quantities of materials, but 68.38 hours of skilled labor.

This simple structure was adopted to facilitate prompt reporting of changes due to price and wage rate movements, both as to direction and degree.

Both indexes have proved, over the years, infallible as to direction and, in normal times, accurate as to degree. Under abnormal conditions of increasing or decreasing job productivity, allowance for the "intangibles" listed above should be made in measuring the degree of change in overall completion costs, or of construction selling price.

Supplement to Engineering News-Record, October 8, 1953. Business News Department, Engineering News-Record, 330 West 42nd St., New York 36, N. Y.

1953 By McGraw-Hill Publishing Co., Inc.


Index, 1913=100
700
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400
300
200
BOSTON
CONSTRUCTION COST
20 Cities
BUILDING COST
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PHILADELPHIA
MONTREAL
PITTSBURGH
CLEVELAND
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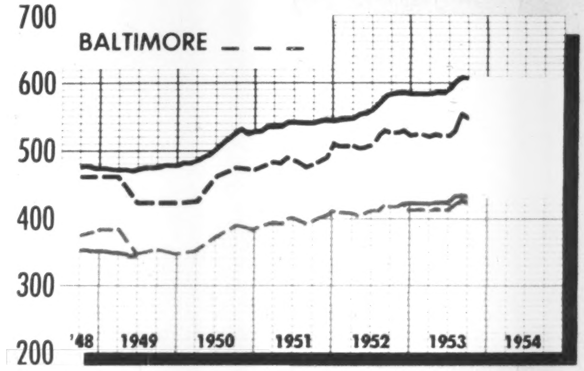
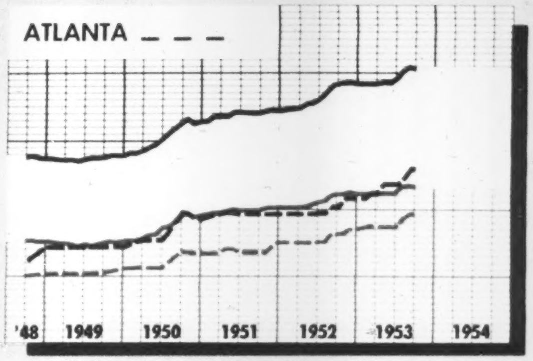
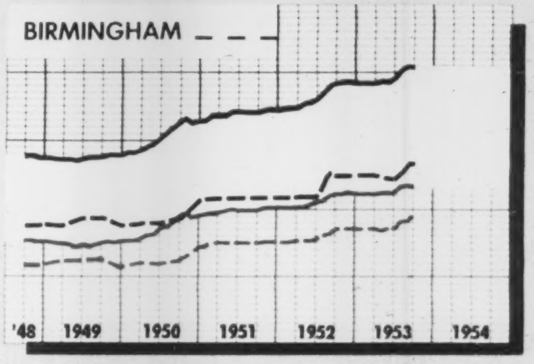
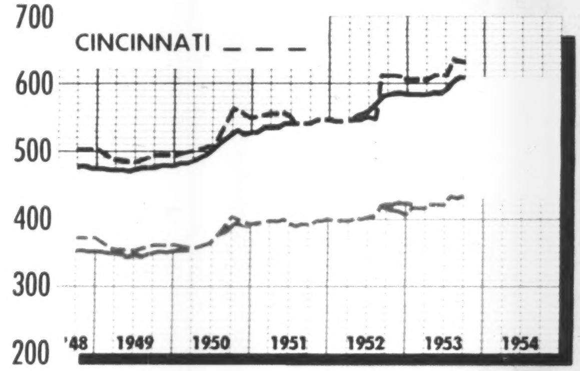




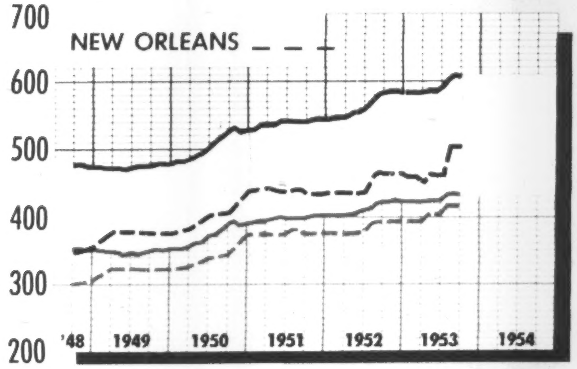


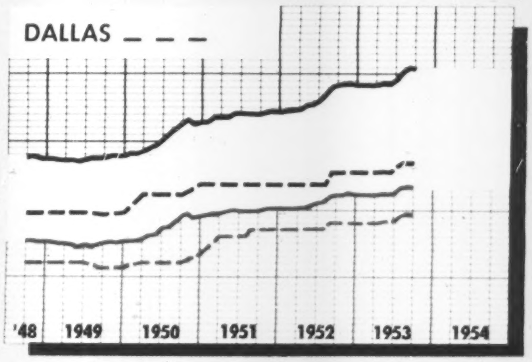


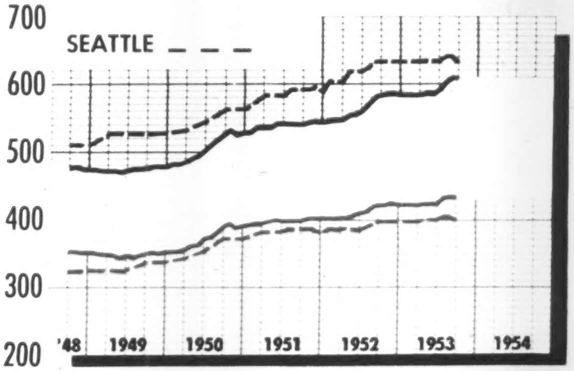
ENR Cost Indexes in 21 cities

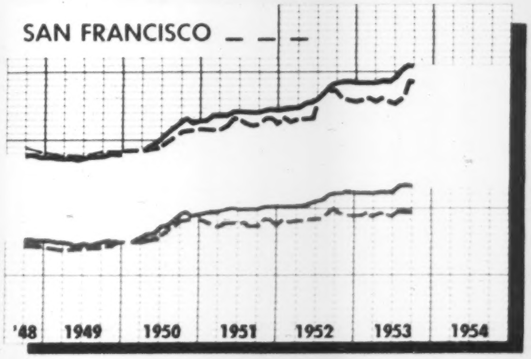
Components of Construction Cost Index and weighting in U.S. cities are: 25 cwt structural steel shapes, base mill price; 6 bbl portland cement, bulk, 1.088 Mfbm 2x4, S4S lumber, 200 hr common labor, at local prices. In Montreal, warehouse price of steel has to be used, so 15 cwt is weighting for steel. Price of Canadian steel is used prior to Oct. 1949 – the average of Canadian and U. S. steel prices is used after devaluation of Canadian dollar in Oct. 1949. Cement weighting is 10 bbl. Other elements are same as for U. S. cities. Components of Building Cost Index and weighting are same but 68.38 hr skilled labor is used instead of common labor.

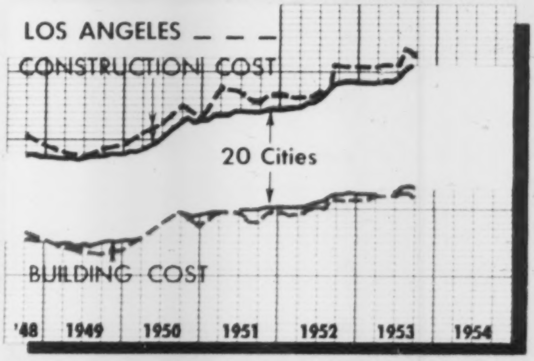
These ENR Cost Indexes measure movements in the cost to contractors and engineers of construction materials and labor. They do not adjust for productivity. Where major differences between cities occur, the main reason is found usually in wage differentials. Lower wages are often accompanied by lower productivity, hence allowances for job productivity should be made in estimating end-product-price, or construction-selling-price trends based on the cost trends shown here.











TWO KINDS OF INDEXES ARE RECORDED HERE:
1, the cost indexes, which measure the trend in cost to the contractor of labor and materials.

2, the price indexes, which measure the trend in the price charged by the contractor for the finished building.

Aberthaw Co., Boston, Mass. Since March 31, 1946, a composite of 36 major cost items in three multi-story and two one-story New England industrial buildings, including all mechanical trades. Repriced quarterly using actual and estimated labor and material costs. Base: 1914 = 100. (Prior to March 31, 1946, based on New England seven-story and basement, 62′4″ x 202′4″, reinforced concrete building built in 1914.)

American Appraisal Company, Milwaukee, Wis. Based on detailed analysis of materials and labor required for four types of buildings (frame, brick, concrete and steel) in 30 representative cities. Corrects for labor productivity but assumes normal average conditions and does not recognize overtime or bonus payments to labor or premiums paid for materials in individual cases or under temporary abnormal conditions. Applies to construction only, does not include plumbing, heating, lighting, sprinklers, fixtures and decorations. 1913 = 100. For values in 22 cities see accompanying page.

Associated General Contractors of America (AGC), Washington, D. C. Wages and materials for 12 cities combined in 40-60 ratio. Wages, prevailing rates for hod carriers and common labor. Materials, weighted: sand, gravel and crushed stone, 1; cement, 1; lumber, 1; hollow tile, ½; structural and reinforcing steel, ½. 1913 = 100.

Austin Co., Cleveland, Ohio. Reprices typical one-story, steel frame, monitor type industrial building. Includes concrete foundations; brick curtain walls; continuous steel sash; concrete floor laid on ground; 2-in. wood roof deck on timber purlins covered with 4-ply waterproofing, monitor sash with mechanical operators, but no heating, lighting, plumbing, sprinkler or other services. Priced quarterly for central and eastern states. 1926 = 100.

E. H. Boeckh & Associates, Inc., Washington, D. C. Current indexes are calculated upon an actual survey at source of local construction cost conditions. Material prices used are those paid by contractors to material dealers. Labor rates are current rates paid by contractors — certain corrections being made in certain areas for labor efficiency and labor shortage. Index includes construction overhead, sales taxes, compensation insurance and social security. Base 1926-'29 = 100. Special purpose indexes are reported monthly for ten classes of buildings in 47 cities.

Boeckh index shown in these charts is the national average for all five Boeckh commercial and factory building indexes, converted to 1913 = 100.

Fruin-Colnon Contracting Co., St. Louis, Mo. Industrial plant of five buildings in St. Louis repriced monthly on basis of contractor's actual and estimated material and labor costs. 1913 = 100, 1926 = 100 both used as bases.

George A. Fuller Co., New York, N. Y. Composite of 36 major cost elements, in three commercial type buildings, including mechanicals, elevators, wiring, heating and ventilating, repriced. 1913 = 100.

Marshall and Stevens, Inc. of Illinois, Chicago, Ill. Indexes cover both comparative building costs, 1902 to date, and comparative equipment costs, 1913 to date. For industrial equipment costs see accompanying page. The building indexes are national averages with a system of modifiers to get regional and municipal values for each of four types of building: A. Fireproof, protected steel, B. Fireproof, reinforced concrete, C. Masonry buildings, D. Frame. They reflect normal costs in line with recognized or published prices of building materials, equipment and labor. Extraordinary or intangible conditions are not included. 1926 = 100.

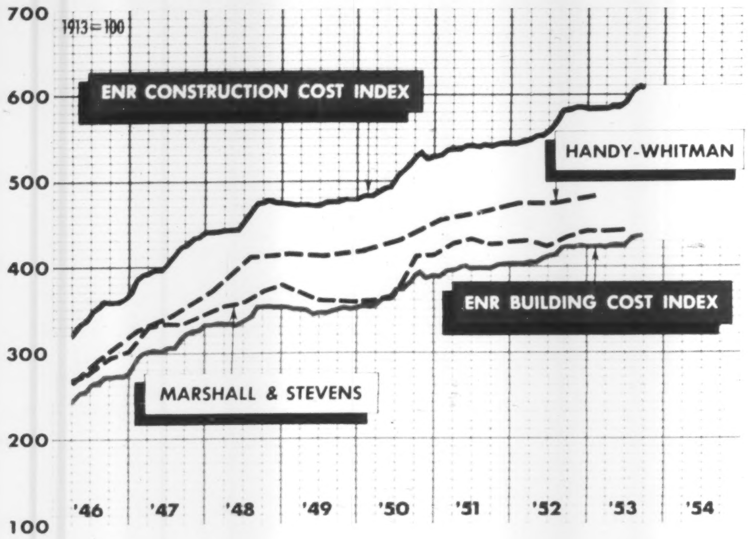
Smith Hinchman & Grylls Inc., Detroit, Mich. Actual in-place costs, using building material costs, freight rates, skilled and unskilled labor rates and including labor efficiency and premiums, bidding competition, contractor profit margins and overhead. Figured with the contractor overhead are taxes, duration of projects, material expediting and labor procurement. Reported monthly. 1926 = 100.

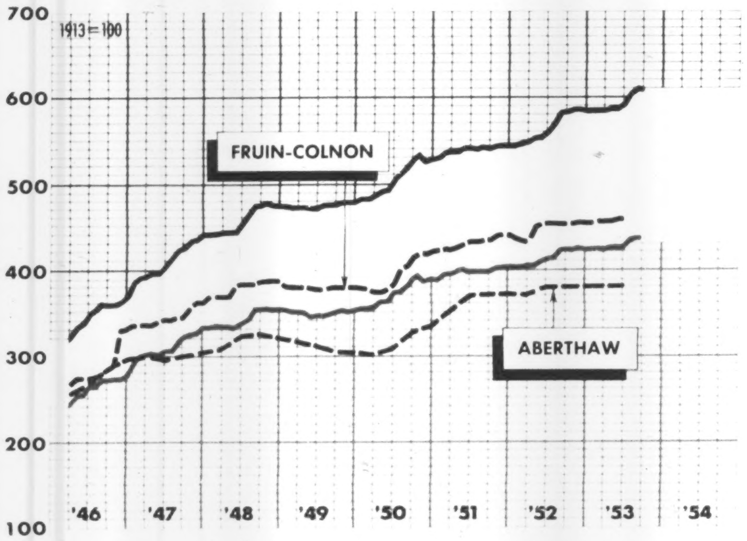
Turner Construction Co., New York, N. Y. Eastern cities. Own cost experience on labor rates, material prices, productivity of labor, efficiency of plant and management, competitive conditions, forecast of price trends. 1939 = 100.

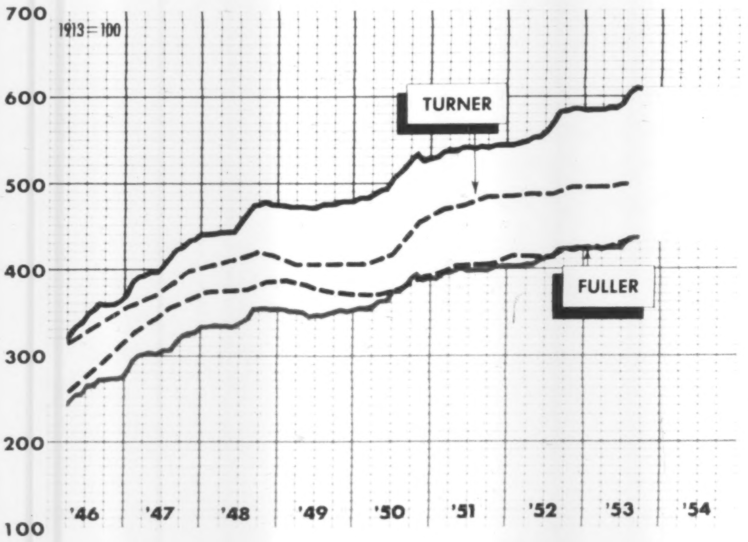
Railroad Construction Cost Indexes — Released annually, by Engineering Section, Bureau of Valuation, Interstate Commerce Commission, Washington, D. C., include items developed from analysis of major construction contracts over a period of years. 1910-1914 = 100. The series for stations and office buildings is used in the charts.

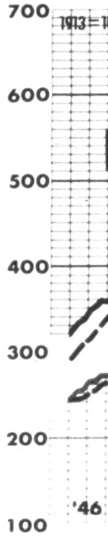
Handy-Whitman, Whitman, Requardt & Associates, Inc., Baltimore, Md. Public utility cost indexes for 14 items of building construction, 17 items of gas plant construction and 64 items of electric light and power construction in six regions. Selected items are shown in a table on an accompanying page. 1911 = 100, 1911-14 = 100. The series used in these charts is for reinforced concrete building in the Pacific Division.

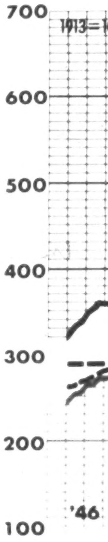
Indexes reported on 1926 = 100, 1926-29 = 100 and 1939 = 100 bases are converted to a 1913 base for plotting on these charts. Others are used on their original bases without conversion.

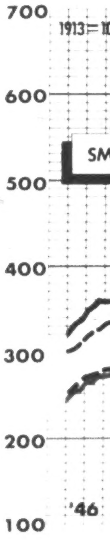


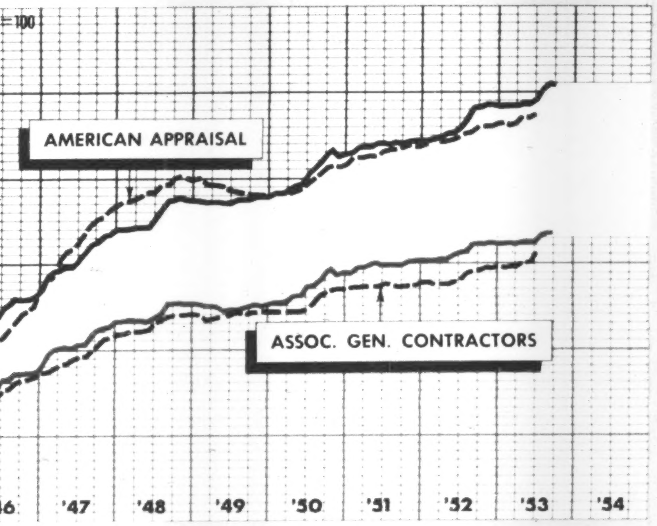


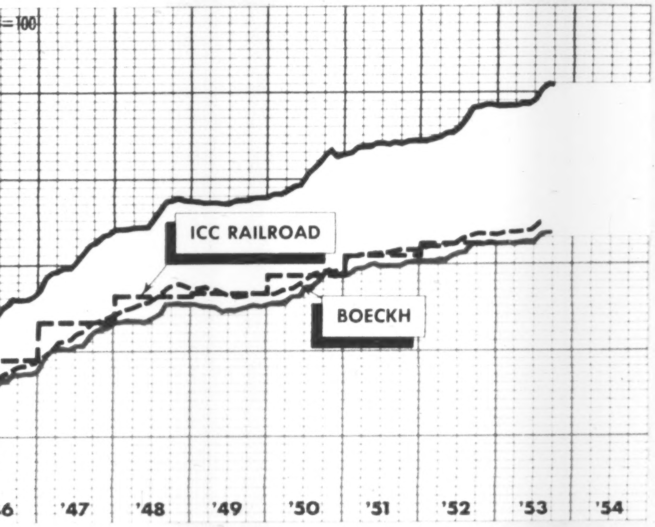


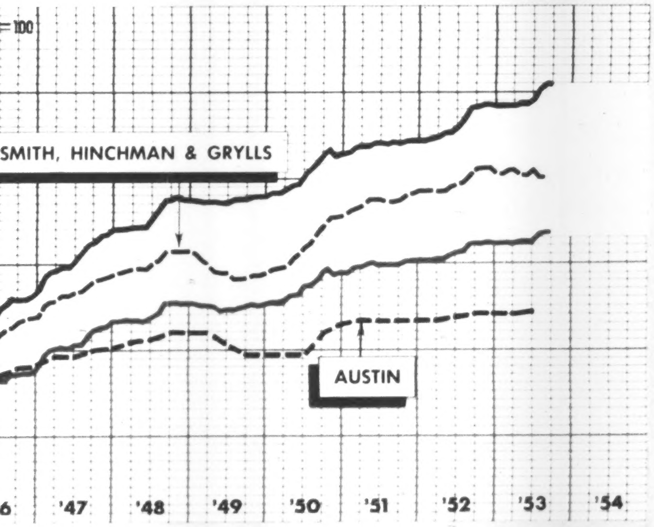










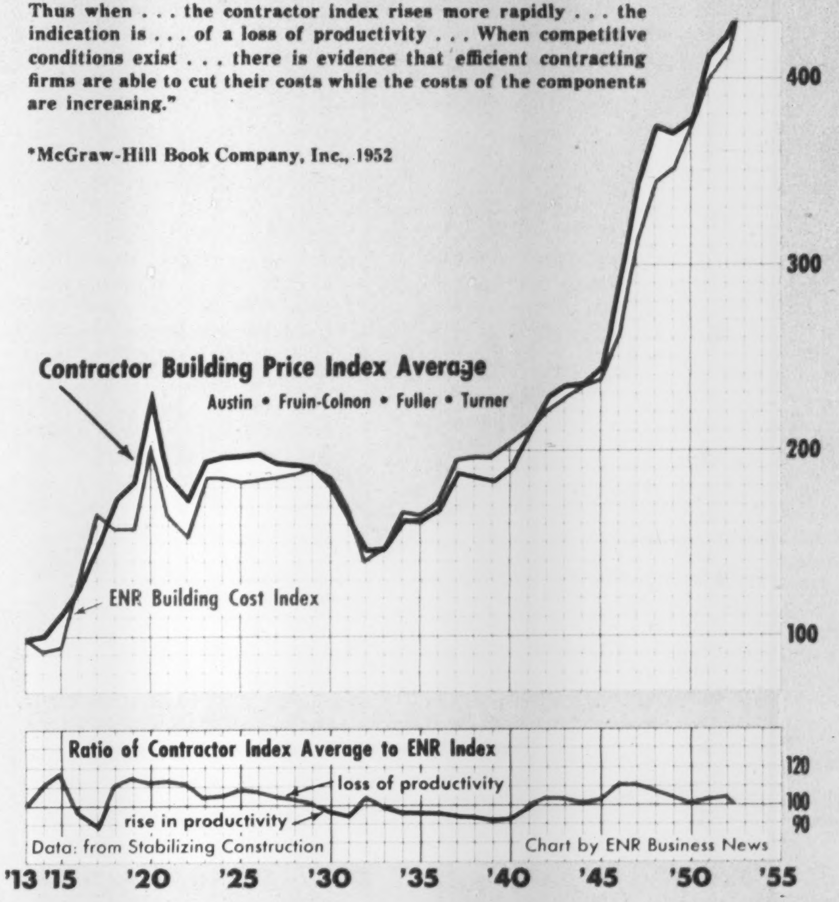


Cost and Price Indexes Compared

Between the cost of labor and materials and the price of the finished building is the product of construction management and the measure of its ability to increase construction productivity. Colean and Newcomb say, for example, in *Stabilizing Construction*,*

"Some evidence of the ability of management to effect improvements in productivity may . . . be gleaned from . . . comparison of two building-cost indexes, the first that of the *Engineering News-Record* and the second a composite of the cost indexes of four well-known construction firms . . . Since the *Engineering News-Record* index is a combination of wages and materials prices according to a fixed relationship, while the combined contractor index is based on estimates of the actual cost for erecting comparable structures, a comparison of the two should at least suggest the changes in cost that result from changes in efficiency . . . Thus when . . . the contractor index rises more rapidly . . . the indication is . . . of a loss of productivity . . . When competitive conditions exist . . . there is evidence that efficient contracting firms are able to cut their costs while the costs of the components are increasing."

***McGraw-Hill Book Company, Inc., 1952**



How to recognize and interpret stages in cost trend cycles:

BEGINNING

of downtrend
(each block bottom emerges lower than preceding one)

of uptrend
(each block top emerges higher than preceding one)

CONFIRMATION

blocks expand · breakaway gap appears · gaps widen
trend line is established

on downtrend
(by line drawn through top right corners of blocks)

on uptrend
(by line drawn through bottom right corners of blocks)

MOMENTUM

increases
blocks expand · gaps widen · trend line misses block · new trend line is set

decreases
blocks contract · gaps narrow · trend line is penetrated by curve or blocks

TERMINATION

trend line is penetrated · blocks constrict · gaps close

STABILIZATION

blocks are thin · block tops or bottoms level off · no gaps appear

All three indicators must be in agreement for positive confirmation of trend

The construction cost rise is slowing down some but has not yet run its course according to the Petit system of measuring long-range cost movements. This system is designed to distinguish between a major cost trend and any minor temporary fluctuations in the costs curve.

This new method of analysing the costs outlook was introduced to Engineering News-Record readers September 4, 1952, page 98, with a full-scale analysis of historical turning points as recorded by the ENR Construction Cost Index.

Mr. Petit constructs his chart like this:

He computes the 12-month moving average. This irons out temporary ups and downs and reveals the long-range trend.

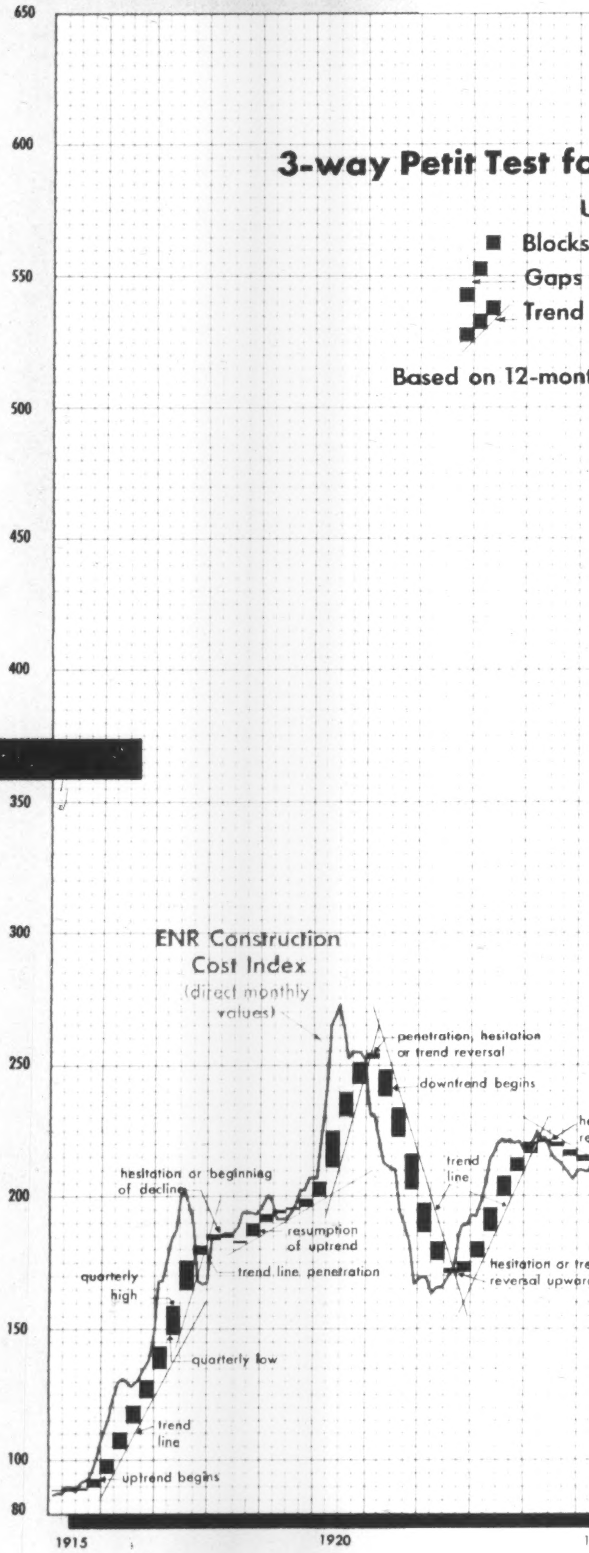
He then plots his blocks by taking for each quarter, the highest and the lowest points on the moving averages for that quarter and blacking in the space between them.

How to interpret the meaning revealed by these blocks, the gaps between them and the trend lines they establish, is shown in the outline above and the chart itself at the right.

In summing up the actions of his chart Mr. Petit issues two warnings:

1. All three elements – expanding or contracting blocks, appearance of gaps, pierced trend lines – must be in agreement to confirm major changes.
2. Waiting out such confirmation may take patience, but premature conclusions can be dangerous. When the blocks, gaps, trend lines appear to be moving indecisively, very little can be lost by awaiting the appearance of better evidence.

He adds, a cost trend – once begun – does not reverse itself suddenly. Due to its peculiar momentum, such a trend proceeds in the same direction for many months – even years.



George H. Petit Trend Analysis, Hartford, Conn.

for Recognizing Construction Cost Trends

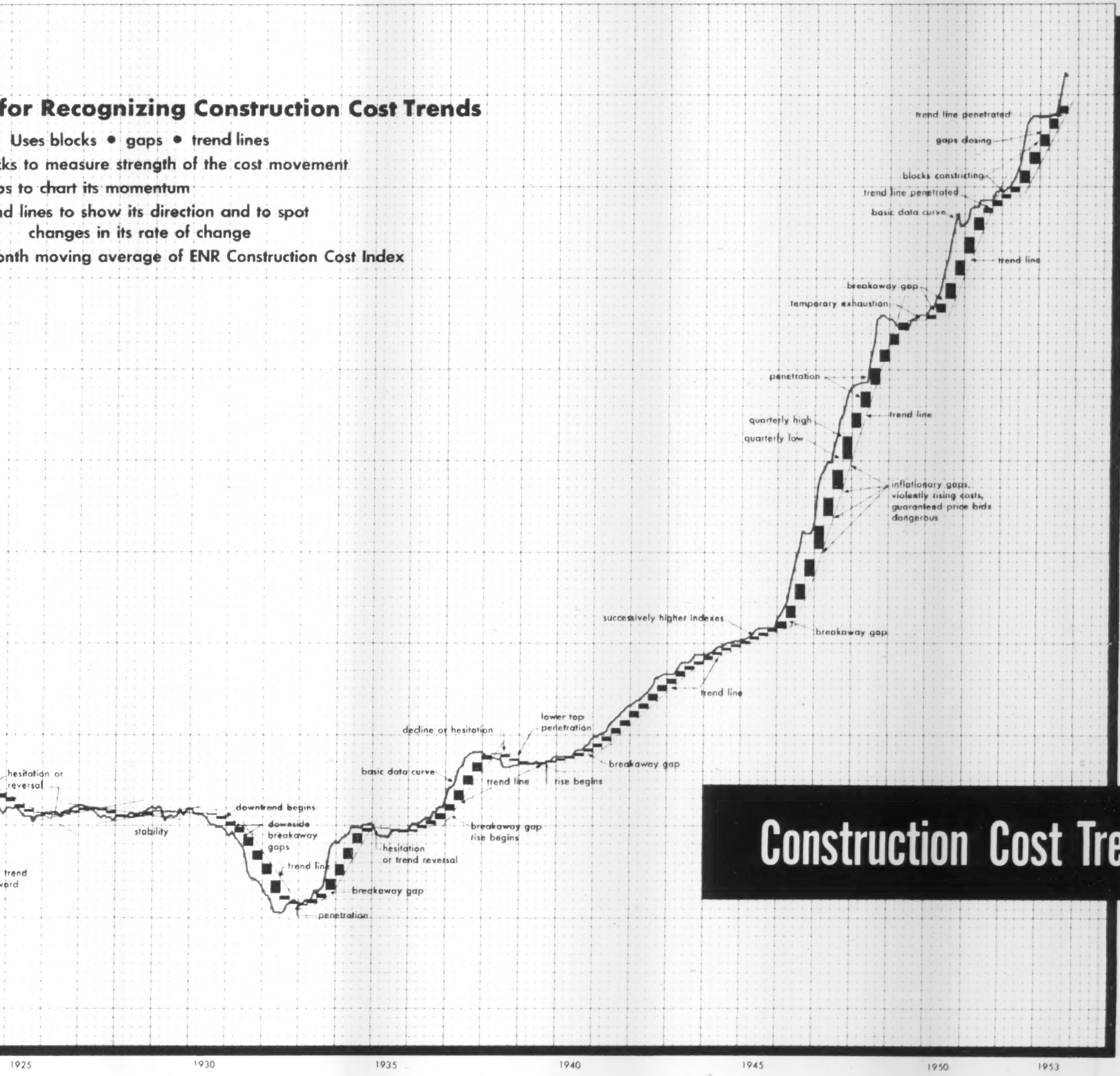
Uses blocks ● gaps ● trend lines

ks to measure strength of the cost movement

s to chart its momentum

d lines to show its direction and to spot
changes in its rate of change

nth moving average of ENR Construction Cost Index



Construction Cost Trends

ENR Business News

History and use of ENR cost indexes

The construction cost index was established in 1921, based on structural steel, portland cement, lumber and common labor. The building cost index was added in 1938 to measure the effect of skilled wage trends on costs. Both use the same materials component.

Such minor changes as have been made are recorded in full in ENR, September 1, 1949, page 398.

Both indexes assume a hypothetical block of construction requiring 6 bbl of cement, 1.088 Mftbm of "2x4" lumber and 25 cwt of structural steel. The construction cost index uses 200 hr of common labor. The building cost index uses 68.38 hr of skilled labor. Both are reported monthly on a 20-cities average basis, both are available quarterly, since September, 1948, for each of the cities for which ENR reports prices and wages.

Engineering News-Record Cost Indexes—1913 = 100

CONSTRUCTION

	1926	1932	1939	1942	1945	1946	1947	1948	1949	1950	1951	1952	1953
January	207.2	162.5	234.7	267.6	302.5	316.3	387.0	441.7	477.4	484.7	531.9	547.8	587.3
February	206.6	161.8	234.3	269.4	303.7	319.5	393.7	442.7	475.4	484.9	538.0	549.3	587.2
March	207.7	157.2	234.4	269.7	304.5	323.8	395.5	443.6	474.8	488.4	539.2	550.6	587.4
April	207.1	153.1	234.9	271.8	306.4	334.6	399.6	443.6	474.3	491.9	540.0	554.1	589.5
May	207.3	152.8	234.7	272.3	307.4	339.7	400.0	444.9	472.1	496.6	542.9	557.1	589.0
June	204.8	152.2	235.0	274.2	309.0	348.7	406.6	455.8	473.8	506.9	542.8	561.7	593.2
July	207.8	153.4	234.9	277.7	309.0	354.7	413.8	464.8	477.5	512.7	542.3	570.7	604.1
August	208.3	156.8	234.9	281.6	309.1	361.4	422.9	477.1	478.2	521.4	542.9	583.7	611.9
September	208.3	158.0	235.0	281.6	309.3	360.2	426.4	478.4	479.8	530.4	543.0	586.1	610.2
October	209.8	159.2	236.9	282.4	309.3	360.9	434.6	480.2	480.5	535.6	546.5	588.4	.....
November	210.8	158.2	238.2	283.6	309.3	362.5	436.9	478.3	480.0	529.2	547.2	588.6	.....
December	210.8	158.5	238.2	283.7	313.5	369.3	441.1	477.7	480.3	530.0	547.7	587.5	.....
Average	**208.0**	**157.0**	**235.5**	**276.3**	**307.8**	**346.0**	**413.2**	**460.7**	**477.0**	**509.4**	**542.0**	**568.8**	.....

BUILDING

	1926	1932	1939	1942	1945	1946	1947	1948	1949	1950	1951	1952	1953
January	182.3	150.6	196.2	217.1	236.5	242.2	294.6	333.6	354.9	356.2	393.0	405.8	425.0
February	183.7	147.2	196.2	218.4	237.7	243.9	301.6	335.5	352.9	356.5	398.2	406.2	425.2
March	184.3	145.9	196.5	218.9	237.9	245.4	303.3	334.2	352.5	360.0	399.3	407.4	424.9
April	184.1	135.7	196.5	219.6	238.5	254.4	305.2	334.6	351.4	362.8	400.1	407.9	426.5
May	183.6	136.4	196.6	220.1	238.5	258.1	304.6	333.9	348.9	364.3	401.1	410.3	426.3
June	181.8	137.6	196.4	221.2	239.4	265.3	307.4	339.3	349.3	373.4	400.8	412.5	426.3
July	184.3	139.5	196.8	223.5	239.6	267.3	308.9	342.4	349.5	377.7	400.3	414.5	435.3
August	185.1	139.4	196.5	225.4	239.9	272.3	317.8	355.5	350.9	383.1	401.2	422.4	437.1
September	185.1	139.6	196.6	225.5	240.1	272.4	322.6	356.7	352.0	392.8	400.3	424.4	436.2
October	188.0	140.0	198.5	225.9	240.4	273.0	327.3	357.1	353.0	397.4	403.4	424.8	.....
November	188.0	139.5	201.2	226.6	240.6	274.0	329.2	355.9	352.9	390.2	404.5	426.0	.....
December	188.0	140.0	201.2	226.6	240.8	280.0	333.1	355.6	353.2	391.4	405.7	424.9	.....
Average	**184.9**	**140.9**	**197.4**	**222.4**	**239.1**	**262.4**	**313.0**	**344.5**	**351.8**	**375.5**	**400.6**	**415.6**	.....

These indexes measure trends in what construction men have to pay for labor and materials. They do not adjust for productivity of management or labor, for materials substitutions, for overtime, for mechanization, for competitive conditions. Elsewhere in these pages they are compared with contractor indexes and bid price indexes that do reflect these "intangibles."

For conversion to other base years, see following page.

ENR Cost Indexes in 21 cities, 1913 = 100

CONSTRUCTION

	1948		1949				1950				1951				1952				1953		
21 Cities	**Sept.**	**Dec.**	**Mar.**	**June**	**Sept.**	**Dec.**	**Mar.**	**June**	**Sept.**	**Dec.**	**Mar.**	**June**	**Sept.**	**Dec.**	**Mar.**	**June**	**Sept.**	**Dec.**	**Mar.**	**June**	**Sept.**
Atlanta	325	345	345	345	345	345	354	354	394	390	395	395	395	395	395	397	402	418	424	438	460
Baltimore	462	462	462	445	424	424	427	462	479	474	486	488	482	513	510	511	530	526	524	525	551
Birmingham	378	379	379	389	389	377	381	381	388	413	416	416	416	416	417	417	450	450	450	447	469
Boston	513	508	507	526	525	532	536	556	570	563	576	586	590	588	590	614	630	629	626	623	626
Chicago	537	530	527	526	541	542	550	584	607	593	603	598	620	624	626	626	661	661	661	690	691
Cincinnati	505	505	490	487	496	496	502	510	568	553	559	556	543	548	547	553	612	609	609	613	633
Cleveland	535	523	520	514	525	530	537	578	605	587	607	605	597	626	625	685	684	682	682	706	709
Dallas	398	398	398	398	394	397	422	423	423	438	437	437	437	437	437	437	455	455	455	463	470
Denver	499	496	482	482	470	470	491	506	541	528	552	558	564	564	571	572	577	612	602	582	604
Detroit	511	500	501	489	514	515	521	555	583	592	592	602	601	601	621	625	656	663	663	664	690
Kansas City	500	500	484	501	511	511	528	551	571	570	570	575	586	586	586	588	623	623	623	623	630
Los Angeles	511	495	482	478	489	494	511	529	552	537	580	572	558	569	565	574	610	610	610	612	627
Minneapolis	512	510	504	504	512	512	516	538	555	562	557	587	587	592	593	593	628	628	628	655	661
New Orleans	350	354	379	379	379	379	383	402	408	412	441	439	434	435	435	437	466	466	476	486	506
New York	549	541	537	534	533	539	546	575	620	611	618	616	609	615	612	618	655	653	653	652	695
Philadelphia	470	467	462	492	517	515	518	541	556	575	575	575	582	582	601	616	636	636	636	635	666
Pittsburgh	470	502	502	492	492	492	497	499	532	529	531	531	551	557	557	577	607	607	607	608	640
St. Louis	542	542	527	508	524	522	529	552	579	569	585	597	584	587	587	608	629	628	627	648	653
San Francisco	590	484	478	478	483	483	486	495	513	519	518	533	525	527	532	565	573	559	557	556	587
Seattle	512	512	530	530	530	530	534	548	564	563	586	586	593	592	606	620	635	635	635	636	636
Montreal	406	408	407	408	396	394	397	397	428	427	445	473	484	484	500	510	512	512	516	516	550

Components of Construction Cost Index and weighting in U. S. cities are: 25 cwt structural steel shapes, base mil price; 6 bbl portland cement, bulk, 1,088 Mfbm 2x4 S4S lumber, 200 hr common labor, at local prices. In Montreal, warehouse price of steel has to be used, so 15 cwt is weighting for steel. Price of Canadian steel is used prior to Oct. 1949—and the average of Canadian and U. S. steel prices is used after devaluation of Canadian dollar in Oct. 1949. Cement weighting is 10 bbl. Other elements are same as for U. S. cities.

BUILDING

	1948		1949				1950				1951				1952				1953		
21 Cities	**Sept.**	**Dec.**	**Mar.**	**June**	**Sept.**	**Dec.**	**Mar.**	**June**	**Sept.**	**Dec.**	**Mar.**	**June**	**Sept.**	**Dec.**	**Mar.**	**June**	**Sept.**	**Dec.**	**Mar.**	**June**	**Sept.**
Atlanta	302	308	308	308	309	313	316	316	339	339	339	339	339	351	351	353	364	371	376	376	394
Baltimore	375	387	387	349	354	351	354	375	391	387	398	403	398	413	410	414	420	416	414	415	427
Birmingham	320	321	326	329	330	320	321	321	328	345	351	351	351	353	355	358	372	372	372	372	391
Boston	363	357	357	362	361	372	375	379	396	392	404	407	412	410	411	422	426	425	422	419	433
Chicago	360	353	350	349	352	353	361	381	404	391	401	395	403	413	415	416	432	433	433	443	443
Cincinnati	374	374	358	356	362	362	360	368	406	392	400	398	395	401	400	406	423	420	420	424	435
Cleveland	352	339	337	332	342	349	356	379	406	388	402	400	391	403	403	419	431	428	430	435	439
Dallas	322	322	322	322	316	318	322	323	323	338	362	362	371	371	371	371	382	382	382	387	397
Denver	369	365	351	351	359	359	378	395	423	400	426	432	423	425	431	433	452	462	452	434	449
Detroit	358	347	348	336	351	351	357	376	404	400	402	411	410	413	419	424	439	438	438	442	453
Kansas City	366	367	352	357	357	357	374	390	410	406	406	411	417	417	431	434	446	446	446	452	442
Los Angeles	368	356	343	339	336	340	360	380	392	377	403	395	381	398	394	407	415	415	420	421	420
Minneapolis	370	368	361	361	361	363	377	389	406	413	412	421	423	438	438	438	450	454	454	459	468
New Orleans	302	310	325	325	325	325	329	340	346	350	379	377	379	379	379	481	397	397	398	407	419
New York	403	395	400	398	397	402	410	439	464	459	466	463	457	462	460	465	487	484	484	483	505
Philadelphia	394	391	386	394	394	392	397	415	430	449	449	449	456	461	462	472	477	480	480	479	494
Pittsburgh	376	384	384	374	375	377	382	387	401	397	400	400	405	416	416	416	427	439	439	440	460
St. Louis	385	391	386	375	379	377	384	396	431	421	432	436	422	427	429	444	448	447	446	446	457
San Francisco	350	347	341	341	341	345	352	361	383	389	375	380	377	379	383	386	401	390	391	390	397
Seattle	328	328	328	328	340	341	344	358	374	374	384	384	389	383	389	389	400	400	400	401	402
Montreal	314	316	315	316	316	314	317	317	346	345	363	378	385	385	383	393	395	395	399	399	430

Components of Building Cost Index and weighting in U. S. cities are: 25 cwt structural steel shapes, base mill price; 6 bbl portland cement bulk, 1,088 Mfbm 2x4 S4S lumber, 68.38 hr skilled labor, at local prices. In Montreal steel weighting is 15 cwt and cement, 10 bbl. Other elements are same as for U. S. cities.

These ENR Cost Indexes measure movements in the cost to contractors and engineers of construction materials and labor. They do not adjust for productivity. Where major differences between cities occur, the main reason is found usually in wage differentials. Lower wages are often accompanied by lower productivity, hence allowances for job productivity should be made in estimating end-product-price, or construction-selling-price trends based on the cost trends shown here.

KINNEAR

The Name that Means the Finest in

STEEL ROLLING DOORS

- OPEN STRAIGHT UPWARD . . . NO WASTED SPACE ANYWHERE
- MAXIMUM PROTECTION FROM ELEMENTS AND INTRUSION
- HEAVY 1.25 OZ. PER SQ. FT. ZINC COATING FOR WEATHER RESISTANCE
- NEAT APPEARANCE HARMONIZES WITH ANY ARCHITECTURE

The enduring steel curtain of the Kinnear Rolling Door offers the maximum in protection and doorway efficiency. Coiling freely above the lintel, no usable space is wasted anywhere . . . walls and ceilings are never blocked by the open door, permitting placement of windows wherever most convenient. Floor space may be used within inches of the doorway. Overhead lights are never obstructed. Kinnear Steel Rolling Doors stay attractive and rust free due to their heavy 1.25 oz. per sq. ft. zinc coating. Kinnear's Paint Bond (a special phosphate coating) permits easy, thorough painting over the galvanized surface.

The rugged steel interlocking curtain is engineered to the individual opening, insuring an accurate closure. Slats ride in a deep channel guide from floor to lintel, anchoring them against wind damage.

Kinnear Doors may be manually or power-operated. Control switches for Kinnear Power Units may be located at convenient spots. Auxiliary chain control permits easy operation in event of emergency power failure.

Write for full details.

KINNEAR STEEL RōL-TOP DOORS

Like all Kinnear Doors, Rōl-Top Doors open upward, but have the advantage of allowing installation of glass areas of desired size. Rōl-Top Doors are built of heavy sheet steel, galvanized with 1.75 oz. of zinc per square foot and treated with Kinnear Paint Bond, a special phosphate coating which permits easy, thorough painting and lasting adhesion over the galvanized surface. Rōl-Top Doors hinge in sections. Torsion spring-counterbalancing makes opening easy. Heavy duty ball bearing rollers travel in deep, sturdy steel guides. Special jamb seals provide the ultimate in weather protection, but never hamper door operation.

THE KINNEAR MANUFACTURING COMPANY
1820-40 Fields Avenue, Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.
Offices and Agents in All Principal Cities

SAVING WAYS in DOORWAYS

KINNEAR
ROLLING DOORS

ENR Cost Indexes

For other base years

Engineering News-Record Cost Indexes are the aggragative type, thus they may be converted to any base year that convenience dictates. Four such conversions are shown below.

Index Value	Construction Cost Base Years				Bulding Cost Base Years			
Year	'26 = 100	'39 = 100	'40 = 100	'49 = 100	'26 = 100	'39 = 100	'40 = 100	'49 = 100
1926...	100	88	86	44	100	94	91	53
1928...	99	...	...	...	102	...	...	...
1929...	100	...	...	...	103	...	...	...
1930...	98	...	...	...	100	...	...	...
1931...	87	...	...	...	91	...	...	...
1932...	75	...	...	...	76	...	...	...
1933...	82	...	...	...	80	...	...	...
1939...	113	100	...	...	107	100	...	...
1940...	116	103	100	...	110	103	100	...
1941...	124	109	107	...	114	107	104	...
1942...	133	117	114	...	120	113	110	...
1945...	148	131	127	...	129	121	118	...
1946...	166	147	143	...	142	133	129	...
1947...	199	175	171	...	169	159	154	...
1948...	222	196	190	...	186	175	170	...
1949...	229	203	197	100	190	178	173	100
1950...	245	216	211	107	202	190	185	107
1951...	261	230	224	114	217	203	198	114
1952...	273	242	235	119	225	211	205	118
	(a)	(b)	(c)	(d)	(a)	(b)	(c)	(d)

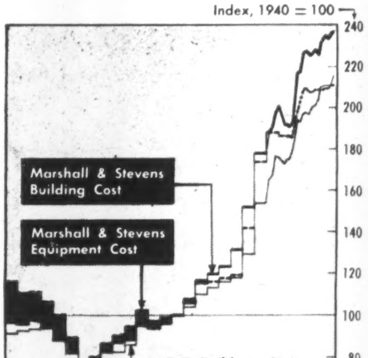
For conversion factors (a, b, c, d), see accompanying table.

Index base conversion table

To change base years for Engineering News-Record Construction and Building Cost Indexes, divide by following conversion factors:

To convert From base 1913=100 to base below		Divide 1913 = 100 values for Construction Cost Index by	Building Cost Index by
1949=100	(d)	4.7702	3.5179
1947-49		4.5033	3.3642
1940=100	(c)	2.4196	2.0281
1939=100	(b)	2.3551	1.9744
1926=100	(a)	2.0803	1.8499
1925-29=100		2.0695	1.8648
1926-29=100		2.0702	1.8747
1929=100		2.0702	1.9086
1910-14=100		0.9380	0.9477
1924=100		2.1536	1.8578
1923-25=100		2.1204	1.8481
1914=100		0.8856	0.9191
1911=100		0.9343	0.9414

(a, b, c, d) conversion factors used to get the accompanying table showing ENR cost index values for four different base years.



BUILDING COSTS continue to rise more than equipment costs.

Building cost index roundup

Yearly averages, 1913 = 100

WEIGHTED	Orig. Base	1926	1932	1939	1942	1945	1946	1948	1949	1950	1951	1952	1953
ENR Construction	1913=100	208	157	236	276	308	346	461	477	509	542	569	610 Sept.
ENR Building	1913=100	185	141	197	222	239	262	345	352	375	401	416	436 Sept.
American Appraisal*	1913=100	217	155	200	241	271	322	490	490	500	532	553	580 July
Assoc. Gen. Contr	1913=100	197	171	188	209	231	257	332	342	357	377	388	416 Sept.
Boeckh, U. S. aver	1926–29=100	181	144	191	214	252	275	365	369	386	415	430	450 July
Marshall & Stevens	1926=100	185	130	183	218	248	288	368	365	390	430	436	450 Sept.
Smith, Hinchman & Grylls*	1926=100	185	128	199	226	285	319	405	395	426	476	...	503 Aug.
ICCRR Sta & Off Bldgs	1910–14=100†	184	141	166	208	244	291	364	368	390	412	426	....
WR & A—RC Bldg Pac Div	1911–14=100†	191	153	192	240	248	273	393	416	426	460	467	501July

* Correct for productivity.

CONTRACTOR	Orig. Base	1926	1932	1939	1942	1945	1946	1948	1949	1950	1951	1952	1953
Aberthaw	1914=100†	197	168	190	223	236	279	321	312	321	370	381	385 June
Austin	1926=100	185	117	152	213	234	273	317	307	313	337	342	346 June
Fruin-Colnon	1926=100	218	178	208	227	247	285	382	382	398	433	449	462 Sept.
Fuller	1913=100	202	157	195	229	241	290	380	382	377	405	416	434 July
Turner	1939=100	195	136	182	245	263	318	422	414	427	478	490	500 July

† Not converted to 1913=100.

Each cost index above arrives at its answer by a different route, some adjust for estimated productivity, some do not. All show that the construction price rise has not been stopped.

These indexes are charted on the accompanying colored insert. They are also defined there to show their purpose and method of construction. They are plotted against a background of ENR indexes to illustrate their similarities and differences.

The ENR Building Cost Index steers a middle third route through them. At mid-1953 it averaged 435, with three contractor indexes lower, two higher. It is close to their average of 425. In 1950, three contractor indexes are above and two are below ENR, and their average of 367 compares with ENR BC index of 375. In both cases the ENR values are closer to the average than are any of the five indexes studied.

Industrial equipment cost indexes

Marshall & Stevens, Inc. of Ill., Chicago, 1926 = 100

Industry	1929	1932	1939	1945	1946	1947	1948	1949	1950	1951	1952	9/53
Average of All	**91.9**	**66.1**	**84.8**	**103.4**	**123.2**	**150.6**	**162.8**	**161.2**	**167.9**	**180.3**	**180.5**	**180.6**
Commercial (aver. of 12*)	91.8	67.6	86.8	105.2	120.9	146.9	158.6	152.7	159.8	171.8	170.6	174.0
Transportation—garage	91.5	69.2	83.6	100.9	123.9	157.0	171.1	170.3	179.7	194.6	195.1	197.3
Public utility (aver. of 2*)	91.8	70.1	82.9	97.5	119.5	145.8	159.6	159.7	164.8	176.1	176.6	178.9
Process (aver. of 9*)	90.5	73.2	83.6	103.8	123.0	149.1	161.9	161.1	166.6	178.1	178.5	180.2
Food (aver. of 10*)	92.6	68.5	84.9	104.1	126.1	156.8	169.7	169.2	177.1	189.7	190.2	192.3
Metal working	92.3	67.9	83.6	110.7	131.2	151.3	161.8	161.8	166.9	178.0	178.6	180.7
Aircraft	93.0	66.7	85.0	109.8	127.0	162.9	178.3	177.5	186.1	201.0	201.7	204.1
Mach. and parts, elec. equip	92.0	68.0	83.4	106.8	130.3	156.6	167.4	167.7	175.0	188.6	189.2	191.1
Textile	91.1	67.8	83.7	101.8	122.1	146.6	157.4	157.3	165.9	192.1	193.3	199.9
Woodworking	92.0	67.2	83.6	100.9	123.0	149.6	160.4	160.4	165.5	176.6	177.1	178.9
General (aver. of 7*)	95.5	68.8	84.6	103.2	122.0	149.7	162.0	161.8	168.2	180.4	180.8	182.5
Cold Storage—refrigerating	92.0	70.0	82.1	101.7	125.7	163.2	176.6	175.8	185.2	200.1	200.7	203.1
Contractors' equipment	91.0	71.9	82.4	102.5	124.2	150.3	161.1	161.1	166.2	177.3	177.8	179.6

* In each of these groups, MARSHALL AND STEVENS reports separate comparative equipment cost trends for:

COMMERCIAL: Apartment, bank, church, hotel, library, restaurant, school, store, theatre, hospital, dwelling, office

GENERAL: Laundry, mining and milling, motion picture, printing, shipbuilding, warehouses, logging

PUBLIC UTILITY: Steam power, electric power

PROCESS: Distillery, cement, chemical, glass, petroleum industry, paint, paper, rubber, clay products

FOOD: Bakery, bottling, brewery, candy, cannery-fish, cannery-fruit, creamery, dairy (flour, cereal feed), packing-fruit, packing-meat

• **M&S** indexes cover both comparative building costs, 1902 to date, and comparative equipment costs, 1913 to date.

The building indexes are national averages with a system of modifiers to get regional and municipal values for each of four types of building. A. Fireproof, protected steel, B. Fireproof, reinforced concrete, C. Masonry buildings, D. Frame. They are designed to reflect normal costs in line with recognized or published prices of building materials, equipment and labor. Extraordinary or intangible conditions are not included. Composite building cost series is converted to 1913 = 100 for table at top of this page and for the colored insert.

Comparative equipment costs, developed to cover the composite of the entire plant, machinery of various kinds, mechanical installation, furniture and fixtures, hand tools and other are combined in proper proportion to their average occurrence in each plant and computed for 47 industries. Eleven series are reproduced here, five of which are averages of 3 or more M&S related series. These are M&S estimates of actual costs paid for installed plant equipment, as a whole.

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Denver, Colorado

ECONOMY FORMS

METAL FORMS FOR CONCRETE CONSTRUCTION

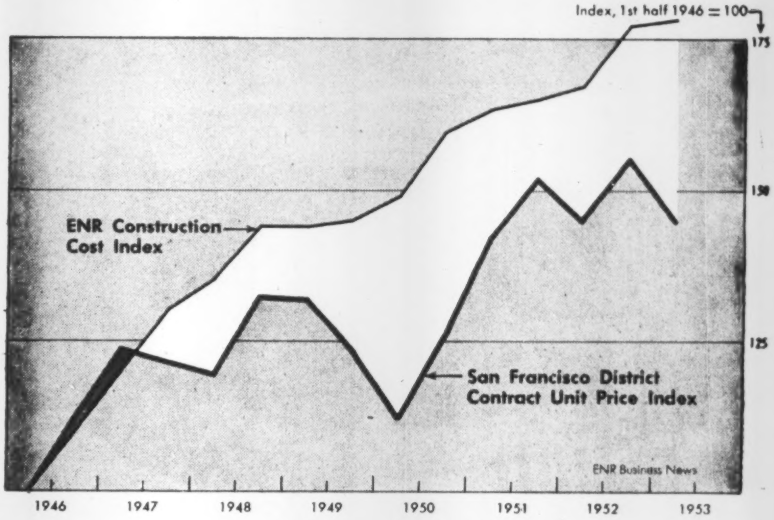
Building Cost Index

American Appraisal Co., Milwaukee

30-cities average and 22 individual cities, 1913 = 100

	'26	'32	'39	'42	'45	'49	'51	'52	July '53
U. S. Av., 30 cities	**217**	**155**	**200**	**241**	**271**	**490**	**532**	**553**	**580**
Boston	224	169	210	248	270	485	532	556	588
New York	234	170	219	248	272	503	545	556	601
Buffalo	219	157	205	247	279	506	551	587	602
Baltimore	224	166	198	248	277	510	545	568	583
Philadelphia	225	161	196	247	275	481	524	547	581
Pittsburgh	236	172	219	249	279	486	524	543	581
Cincinnati	217	157	209	242	272	477	508	529	559
Cleveland	233	160	206	245	268	485	537	556	573
Chicago	219	162	205	235	260	452	503	525	544
Indianapolis	219	157	206	247	276	501	535	560	588
Detroit	224	148	208	252	278	500	549	578	596
Milwaukee	218	144	209	254	280	493	558	586	613
Minneapolis	197	148	202	235	266	453	493	518	553
Kansas City	220	156	209	239	268	469	504	512	534
St. Louis	230	163	208	238	265	478	523	545	574
Atlanta	211	147	186	240	278	514	558	593	639
Dallas	204	146	171	209	246	455	483	503	524
New Orleans	217	145	194	234	277	501	533	550	599
Denver	204	149	195	226	245	441	480	497	524
Seattle	199	141	196	244	277	509	553	577	574
San Francisco	188	144	183	225	244	446	491	509	526
Los Angeles	195	141	167	213	249	475	517	533	556

- **American Appraisal Company,** Milwaukee, Wis.—This index is based on detailed analysis of materials and labor required for four types of buildings (frame, brick, concrete and steel) in 30 representative cities. It is repriced monthly in accordance with: 1. prevailing wage scales and labor performance for the various building trades, and 2. quotations for construction materials in 30 key cities in the United States. The index corrects for labor productivity but assumes normal average conditions and does not give any recognition to overtime or bonus payments to labor or premiums paid for materials in individual cases or under temporary abnormal conditions. It applies to construction only, does not include plumbing, heating, lighting, sprinklers, fixtures and decorations.



Contract unit price index—Western states

Estimates Section, San Francisco District, Corps of Engineers, U. S. Army—1st half 1946 = 100

		Prices										
		1946	1949		1950		1951		1952		1953	'53 Chg.
Items used in index	Unit	1st half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	base price
Cr rock base course	ton	2.81	2.29	2.41	2.37	2.20	2.55	3.05	2.60	3.18	2.80	100
Plant mix aggregate	ton	4.82	4.43	4.35	3.75	4.68	4.68	5.95	5.51	5.25	5.99	124
Plant mix asphalt	ton	22.00	26.85	22.20	18.98	23.00	20.35	20.44	24.34	24.60	24.00	109
Cover aggregate	ton	5.09	5.65	5.50	5.22	5.07	4.67	3.91	4.06	6.62	6.37	125
Structural concrete	cy	50.65	65.07	59.20	54.11	58.00	69.75	75.00	75.81	73.20	71.00	140
Pavement concrete	cy	13.20	19.69	24.83	18.50	20.00	24.46	26.79	18.97	28.88	19.00	144
Reinforcing steel	cwt	9.60	12.70	11.40	11.00	13.40	14.70	15.50	14.30	14.60	13.70	143
Cement	bbl	2.84	4.98	4.52	4.24	4.75	4.75	5.07	4.63	4.77	4.83	170
CM pipe 12"	lf	2.20	3.03	2.88	2.75	3.00	4.04	4.08	3.65	3.85	3.61	164
CM pipe 24"	lf	4.05	5.26	4.88	4.82	5.23	4.41	6.15	6.16	6.53	6.46	160
RC pipe 18"	lf	3.50	4.27	4.55	4.54	5.08	6.38	5.93	5.50	5.83	6.25	179
RC pipe 36"	lf	8.29	10.47	10.70	9.48	10.26	15.76	13.66	14.33	13.27	13.94	168
VC pipe 6"	lf	1.87	2.39	2.29	2.00	2.44	2.91	3.40	2.94	3.32	3.01	161
VC pipe 8"	lf	2.22	2.80	2.81	2.82	2.60	3.86	4.17	3.77	3.93	3.53	159
Sewer manhole	1 10 ea	16.50	20.80	19.20	17.80	21.20	21.20	25.10	22.82	26.66	25.34	153
Roadway excavation	cy	0.67	.96	.90	.64	.78	.78	1.04	.92	1.22	1.07	160
Structural excavation	cy	2.49	4.27	3.26	3.14	3.76	4.08	3.99	3.42	3.70	3.57	143
Watering	M gal	2.13	2.13	1.75	1.66	1.84	2.17	2.06	1.97	2.22	2.14	100
Flat wheel roller	R-hr	5.47	7.82	6.86	7.79	6.92	8.19	6.76	7.26	8.68	8.00	146
Piling, gr wood, fur	lf	0.64	0.65	0.58	0.64	0.88	0.97	1.26	1.68	1.09	1.01	158
Piling, treated, fur	lf	1.25	1.45	1.45	1.20	1.53	1.98	2.03	2.03	1.93	1.77	142
Timber in place	100 fbm	16.60	26.33	25.34	21.20	27.70	32.20	32.00	30.90	30.50	30.80	186
2" Galv steel pipe	lf	1.04	1.38	1.18	1.24	1.33	1.43	1.46	1.51	1.61	1.68	161
Cast-iron pipe 6"	lf	2.86	4.17	3.93	3.50	3.86	4.47	4.95	4.42	5.57	4.15	145
Cast-iron pipe 8"	lf	3.80	6.47	5.01	5.35	5.66	4.67	6.98	6.29	6.64	5.66	149
Gate valve 6"	1 10 ea	7.06	9.70	8.80	8.00	9.00	9.47	12.80	10.55	12.60	11.80	168
Total in dollars		**193.65**	**256.01**	**240.78**	**216.74**	**244.17**	**274.88**	**293.53**	**280.34**	**300.25**	**281.48**	**145**
		Index										
Index. **1st Half 1946 = 100**		**100.0**	**132.2**	**124.3**	**111.9**	**126.08**	**141.94**	**151.57**	**144.76**	**155.04**	**145.35**	

Low bids dropped an average of 6.6% for all types of heavy construction in the first half of 1953 compared with those in the preceding six months. This is the record for the states west of Denver as compiled from unit prices on significant projects by the San Francisco District, Corps of Engineers, Col. Henry Walsh, district engineer. The index, its components and their weights are shown here. The unit bid prices from which this index stems are reported in the unit price pages.

Prestressed concrete costs

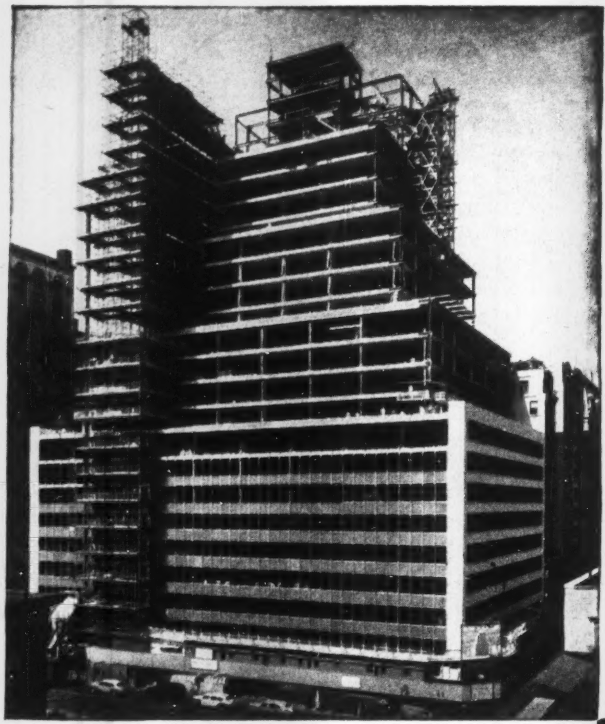
Examples of unit prices on bridges built of prestressed concrete are supplied here through the courtesy of Freyssinet Co., Inc., New York, N. Y.

County bridges, built by Wyoming County, New York, Felix Ramsey, Highway Superintendent, Freyssinet Co., Inc., New York, N. Y., consultants. Prefabricated in winter, erected in summer. Spans 18′ to 62′; loadings, H20-S16 and H15. Prices for decks proper, including eventual sole plates and handrailing range from $4.50 to $7/sf (abutments and deck).

State bridge: Hubbard St. overpass, Glastonbury, Conn., State Highway Dept., owner and engineer; Mariani Construction Co., New Haven, Conn., contractor. One span 54′ (two 34′ roadways, 17′ middle strip, two 2′10″ sidewalks) loading H20-S16. Poured at site in winter, beams steam cured. High early strength cement not permitted. Total contract price $16/sf of deck.

State bridge: Sharon Road bridge in Baltimore-Harrisburg Expressway, Maryland State Roads Comm., owner and engineer. Bonwit Construction Co., New York, N. Y., contractor. One span 100′, 36′ width, H20-S16 loading. Contract price $21.50/sf of deck incl. abutments. For prestressed concrete girders, diaphragm and slab (not incl. mild steel reinf. bars) 245 cy @ $189/cy, or $12.80/sf of deck.

Garrison dam spillway bridge: U. S. Army Corps of Engineers, Bismarck, N. D., owner; Preload, Inc., Consultant; Garrison Spillway Constructors, contractor. Spans, 32 of 47′ each, width 36′ (26′ roadway, two 5′ sidewalks). Loading H20-S16, special heavy. Contract prices $10.60/sf of deck. (Low bidder on bridge was not low on whole job. His price was $7.40/sf of deck.)



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WAYLITE
LIGHTWEIGHT AGGREGATE

Index of building costs—U.S. average 1926-'29=100

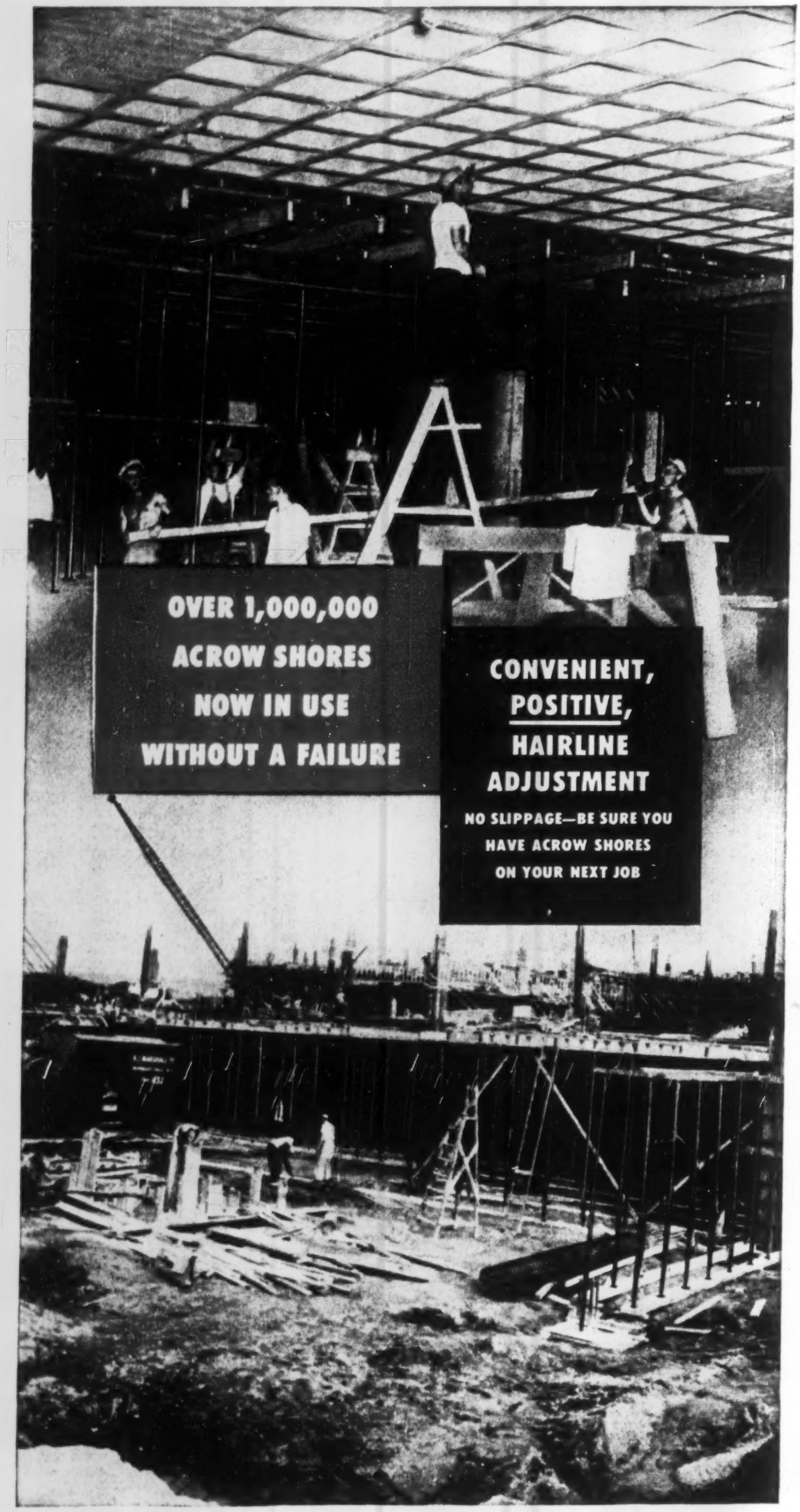
E. H. Boeckh & Assoc., Inc., 1406 M Street, N. W., Washington, D. C.

Annual Averages	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
By Cities	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc.
U. S. AVERAGE										
1926-29	101.4	102.5	102.5	102.8	101.3	102.2	100.8	101.7	102.2	104.6
1939	101.2	104.4	104.1	111.2	109.4	101.3	110.4	105.0	112.1	113.3
1946	161.8	161.9	161.7	154.0	154.8	165.6	145.0	158.7	154.8	156.0
1949	213.8	215.6	215.0	208.1	208.4	218.4	195.5	211.9	208.7	211.4
1950	225.9	227.1	226.7	216.5	217.0	231.3	203.2	222.2	217.4	218.8
1952	249.0	251.8	251.3	242.1	241.7	254.5	227.8	247.5	243.8	245.0
June 1953	253.5	257.4	257.1	251.3	249.6	259.2	239.1	254.0	254.7	257.5
ATLANTA AREA										
1926-29	82.7	87.0	84.2	83.7	87.0	82.9	94.5	84.7	87.5	86.8
1939	82.8	86.0	86.1	95.1	95.0	80.6	96.2	88.6	94.6	97.4
1946	149.2	148.1	148.2	136.8	139.9	151.7	130.0	146.8	135.1	136.4
1949	189.9	189.3	189.3	180.6	185.4	191.7	172.7	186.5	177.5	180.8
1950	196.2	194.3	194.7	185.4	191.0	199.3	183.0	190.0	185.0	183.7
1952	221.0	218.8	219.1	212.8	219.3	224.9	215.4	213.1	214.3	210.1
June 1953	223.5	221.9	222.0	218.2	223.9	227.9	221.3	216.2	220.2	218.6
BALTIMORE AREA										
1926-29	107.2	112.0	107.6	100.6	100.7	106.3	95.5	106.8	96.8	101.2
1939	93.5	95.5	95.6	99.3	99.2	94.0	101.7	96.6	101.4	100.2
1946	163.1	161.7	162.2	149.1	150.8	167.6	138.9	158.8	150.0	148.2
1949	216.4	217.4	217.3	204.5	204.8	220.5	191.8	216.6	204.6	208.5
1950	231.0	231.8	232.1	215.0	216.8	234.9	204.2	230.6	217.7	216.5
1952	253.2	255.3	255.6	239.0	240.7	257.2	226.0	254.7	242.2	241.1
June 1953	253.4	256.3	257.0	243.1	244.8	256.2	233.5	255.0	247.5	247.0
BIRMINGHAM AREA										
1926-29	91.7	96.7	94.1	95.5	96.8	90.2	97.5	94.6	96.3	96.3
1939	87.8	90.9	91.5	96.1	96.2	84.9	96.9	95.1	95.6	96.3
1946	149.3	147.4	147.9	137.3	139.4	149.7	128.1	145.4	135.2	137.4
1949	188.2	187.2	187.6	178.9	182.0	192.8	172.6	183.7	177.7	180.0
1950	196.3	196.1	196.8	186.6	189.4	200.6	179.2	193.9	186.2	187.6
1952	217.6	217.5	217.3	205.8	208.9	221.5	196.2	214.6	205.2	206.1
June 1953	220.4	221.3	221.9	214.5	218.1	224.1	210.1	219.2	216.4	218.1
BOSTON AREA										
1926-29	116.3	120.3	115.4	106.2	107.0	118.8	106.3	112.5	108.7	105.8
1939	106.2	110.4	110.1	116.3	113.7	105.7	114.2	111.5	118.2	118.5
1946	167.0	166.5	166.0	156.8	156.6	172.1	147.1	161.1	158.5	160.4
1949	223.0	226.5	225.9	216.7	215.6	227.1	201.3	222.9	218.2	221.9
1950	234.6	237.8	236.8	227.3	225.5	210.3	210.9	231.8	229.8	232.5
1952	257.2	261.8	261.0	251.0	249.2	262.7	233.5	257.1	254.8	256.3
June 1953	261.3	266.0	265.6	256.3	254.4	265.5	242.2	262.8	261.6	262.7
CHICAGO AREA										
1926-29	109.2	114.2	109.8	113.2	109.1	112.9	105.2	105.9	112.0	116.0
1939	110.6	112.5	111.1	123.6	118.7	114.2	117.6	109.3	122.6	127.6
1946	168.3	166.0	164.2	158.9	156.9	168.1	144.5	157.4	157.0	162.5
1949	219.2	218.3	216.1	210.6	208.7	229.1	193.3	207.7	210.4	215.1
1950	231.9	229.7	227.4	217.8	216.8	243.4	201.2	216.5	219.5	222.6
1952	256.9	255.7	253.0	247.2	243.0	269.2	224.9	241.1	245.9	252.8
June 1953	268.2	268.0	265.4	263.8	257.7	280.9	242.5	253.6	263.9	271.8
CINCINNATI AREA										
1926-29	100.5	105.0	101.3	101.0	100.2	100.2	99.6	103.1	100.6	101.0
1939	103.3	106.2	105.9	113.9	110.4	103.3	111.7	107.1	113.7	116.5
1946	165.6	166.8	166.7	154.5	154.7	167.5	140.7	166.4	154.4	156.1
1949	214.1	216.6	215.8	207.5	206.0	217.9	193.5	214.1	208.4	212.2
1950	220.3	224.1	223.1	213.9	211.7	224.3	199.1	220.4	215.6	218.7
1952	244.8	250.9	250.0	240.5	237.7	248.1	222.2	250.6	242.3	245.4
June 1953	250.6	258.8	257.8	253.6	248.2	253.8	237.2	259.1	256.8	264.1
CLEVELAND AREA										
1926-29	107.2	113.4	108.5	111.3	108.3	109.0	103.0	107.2	110.5	114.8
1939	106.2	109.6	109.5	115.3	112.8	107.5	112.9	109.5	117.7	118.0
1946	169.2	169.4	168.7	160.2	159.9	174.1	146.4	164.3	161.0	165.9
1949	224.8	225.7	223.6	216.0	213.0	233.0	198.5	218.0	217.2	220.9
1950	237.9	237.8	235.4	227.8	224.1	248.1	207.2	227.6	228.4	232.3
1952	262.7	264.3	261.6	255.5	250.4	273.9	232.2	254.2	257.2	261.4
June 1953	270.4	274.1	271.7	269.1	261.9	281.2	248.3	265.2	273.1	278.8
DALLAS AREA										
1926-29	103.1	107.3	103.2	98.9	99.1	103.6	100.5	100.9	99.4	99.7
1939	95.1	95.8	96.7	98.8	100.2	94.8	106.6	96.0	101.9	98.9
1946	150.2	148.8	149.4	139.8	144.4	153.5	140.3	144.6	142.5	141.1
1949	207.2	206.2	206.9	197.1	201.3	210.3	197.1	203.2	201.5	195.4
1950	220.5	221.2	222.1	209.0	212.5	221.3	206.3	218.6	210.1	208.3
1952	242.8	245.7	247.5	237.1	239.3	242.5	241.2	243.4	240.5	237.7
June 1953	243.5	246.1	247.6	239.5	241.9	245.1	246.2	243.5	246.1	242.5
DENVER AREA										
1926-29	95.0	99.7	95.5	102.4	99.6	95.5	105.5	94.6	101.4	108.0
1939	112.1	112.0	111.2	116.1	114.4	114.3	118.7	109.5	117.0	117.8
1946	160.1	160.3	150.4	155.3	157.9	164.0	155.6	156.8	160.0	158.3
1949	212.9	215.8	215.9	211.0	213.1	216.2	207.0	214.3	214.6	215.3
1950	228.2	230.0	229.8	218.8	221.2	232.4	212.3	226.2	221.2	221.3
1952	249.4	253.6	253.5	243.4	245.3	251.5	234.5	251.0	245.6	245.1
June 1953	253.4	259.3	259.1	252.9	252.5	255.5	245.4	258.6	256.0	259.6
DETROIT AREA										
1926-29	103.3	108.4	104.3	102.9	102.4	103.7	103.1	103.5	103.3	104.4
1939	98.8	102.7	102.9	108.6	107.5	98.7	108.8	104.2	111.4	110.1
1946	165.9	165.9	165.8	157.4	157.9	171.3	147.5	160.9	160.0	159.7
1949	221.0	222.6	221.9	212.2	211.5	227.0	196.8	216.8	214.2	215.9
1950	233.0	234.0	233.3	222.8	222.0	240.0	208.1	227.1	226.0	225.7
1952	258.2	259.7	258.3	249.6	247.0	267.3	230.5	250.9	252.4	253.5
June 1953	262.6	265.6	263.9	259.8	254.2	274.8	242.5	260.4	266.1	271.6
KANSAS CITY AREA										
1926-29	100.3	106.5	102.2	105.7	103.3	101.1	105.9	101.9	107.5	108.8
1939	104.4	109.9	109.8	118.3	115.4	103.8	117.2	113.0	120.0	121.6
1946	166.5	165.6	165.4	158.2	159.5	172.3	151.0	159.8	159.3	160.3
1949	215.9	216.7	216.3	209.0	211.1	221.8	199.4	210.0	211.3	211.5
1950	230.5	229.6	228.7	216.0	218.8	238.1	203.6	219.6	217.7	217.8
1952	256.3	258.8	258.2	245.2	245.7	263.3	233.2	251.9	248.3	250.3
June 1953	260.9	263.4	262.8	252.0	251.6	267.8	241.4	257.0	256.0	258.2
LOS ANGELES AREA										
1926-29	92.7	97.9	93.5	98.8	96.8	93.5	97.0	91.3	97.5	103.1
1939	93.6	97.2	97.5	103.7	105.0	95.6	109.5	96.8	106.2	104.9
1946	155.1	156.1	156.2	155.3	156.7	160.1	158.3	150.9	160.0	158.7
1949	203.2	207.0	206.0	209.9	210.7	205.3	201.2	201.8	210.2	212.4
1950	222.8	224.1	223.4	217.4	219.2	227.8	205.5	215.4	217.5	219.0
1952	241.7	243.8	242.9	239.8	240.7	248.3	228.9	235.2	241.5	242.6
June 1953	248.2	252.2	251.5	253.5	252.5	255.2	245.4	244.6	257.9	259.4
MINNEAPOLIS AREA										
1926-29	92.8	98.2	94.6	95.6	96.1	92.8	100.0	93.9	97.9	98.4
1939	101.9	105.0	104.2	113.5	110.7	102.7	113.4	103.6	114.5	117.2
1946	163.7	167.6	167.5	156.5	155.7	164.9	142.6	168.2	157.2	159.5
1949	218.7	218.7	217.7	205.1	206.9	224.4	192.6	211.7	205.8	208.0
1950	228.2	227.9	227.0	210.1	213.2	234.4	198.2	220.3	215.6	211.3
1952	257.3	259.8	256.9	241.3	242.0	263.7	224.6	253.0	242.6	243.1
June 1953	260.9	265.9	265.3	254.5	253.2	266.0	239.6	263.4	259.0	262.4
NEW ORLEANS AREA										
1926-29	93.3	96.3	93.4	86.5	90.6	93.3	93.7	91.5	89.5	86.5
1939	89.0	90.3	91.3	95.4	98.3	88.1	102.8	91.7	98.5	94.9
1946	148.9	147.4	148.2	138.6	142.8	151.2	138.7	145.4	142.0	138.7
1949	201.6	201.4	202.0	188.8	194.6	204.9	186.0	200.0	191.8	189.8
1950	211.7	210.3	211.0	196.2	203.1	215.8	194.4	206.4	199.5	195.3
1952	230.1	228.4	229.2	213.2	220.9	234.7	210.4	224.0	216.5	211.4
June 1953	239.2	239.4	240.0	228.5	233.9	244.2	224.7	236.3	232.9	230.3
NEW YORK CITY AREA										
1926-29	133.3	138.4	131.9	122.8	120.4	137.5	113.1	127.4	123.2	125.3
1939	122.1	123.3	122.5	130.6	125.9	125.6	123.7	119.6	130.0	133.3
1946	182.4	181.8	181.1	177.2	174.6	188.1	158.6	177.4	174.8	179.0
1949	240.8	243.7	242.7	242.8	238.2	247.5	217.3	238.3	240.0	246.4
1950	254.5	256.2	255.2	249.5	246.1	262.1	224.2	249.7	248.0	251.5
1952	274.8	278.2	277.3	271.9	267.6	281.5	248.3	271.5	271.8	274.9
June 1953	277.6	279.6	279.3	275.9	271.6	283.9	257.3	273.5	276.4	279.6
PHILADELPHIA AREA										
1926-29	100.3	106.3	103.7	105.9	103.1	98.1	101.9	104.2	104.1	107.5
1939	99.2	102.6	102.9	105.7	104.1	98.2	102.0	105.0	105.5	106.7
1946	165.0	163.9	164.9	153.2	154.6	169.0	141.2	161.1	152.7	154.0
1949	220.5	220.6	220.3	209.0	209.0	224.3	190.3	216.3	205.6	209.9
1950	234.4	235.1	234.8	221.3	220.7	239.3	202.0	230.5	218.8	222.8
1952	258.2	260.2	260.1	247.9	246.9	262.7	228.9	256.9	247.9	249.2
June 1953	263.8	265.1	264.7	255.5	253.0	268.7	236.2	261.3	254.7	258.9
PITTSBURGH AREA										
1926-29	113.3	118.8	112.8	111.2	107.1	115.4	89.6	112.2	104.6	112.9
1939	113.8	117.0	115.7	117.5	114.2	114.2	109.8	116.5	116.9	119.1
1946	169.5	169.0	168.0	156.6	155.3	173.5	140.1	166.4	153.2	158.9
1949	227.1	229.1	227.7	215.6	212.2	231.3	186.9	227.0	209.8	219.8
1950	237.6	238.6	237.6	222.2	219.8	242.6	196.6	235.3	218.9	224.2
1952	259.1	261.4	260.3	145.8	243.2	264.8	218.3	257.4	243.3	248.5
June 1953	268.7	272.7	271.7	261.5	256.0	274.5	236.1	270.2	261.9	266.9
ST. LOUIS AREA										
1926-29	118.6	121.1	115.7	109.9	108.8	121.3	103.3	111.7	107.7	109.3
1939	107.0	110.2	109.9	118.7	116.4	107.6	114.3	110.3	119.2	119.8
1946	167.4	167.1	166.2	159.1	158.9	171.7	145.3	154.8	158.1	161.1
1949	220.7	221.4	220.7	212.8	212.4	226.8	197.5	217.3	213.6	215.7
1950	230.7	232.8	233.7	221.9	220.9	240.1	204.7	229.5	222.8	225.3
1952	253.2	259.1	253.6	249.7	246.0	265.0	226.2	252.8	249.6	255.0
June 1953	254.3	262.4	265.1	258.9	253.8	267.0	240.2	263.6	261.6	268.4
SAN FRANCISCO AREA										
1926-29	87.7	93.7	90.4	97.5	96.5	86.1	95.5	91.8	95.9	99.0
1939	99.2	105.7	104.5	117.4	114.4	97.6	114.9	107.4	116.5	121.9
1946	157.5	159.7	160.0	157.9	159.0	160.5	151.5	158.4	160.0	159.3
1949	207.1	213.0	212.8	214.0	213.9	210.0	203.9	213.9	216.1	219.8
1950	223.1	227.0	226.8	222.4	222.9	226.1	209.1	224.5	222.6	224.5
1952	245.0	250.2	250.0	245.6	246.1	248.8	236.7	248.2	249.6	248.7
June 1953	248.5	253.7	253.2	252.7	251.0	252.6	241.0	252.1	255.0	256.0
SEATTLE AREA										
1926-29	84.5	92.2	89.2	101.7	95.1	82.4	100.8	92.2	100.5	105.9
1939	96.7	104.4	103.8	119.2	114.9	94.4	115.1	108.3	118.7	125.3
1946	152.9	158.3	157.9	161.2	159.8	154.3	156.0	158.9	164.2	167.1
1949	203.9	214.2	214.0	220.7	218.1	205.2	209.9	218.0	225.3	228.5
1950	213.6	224.1	224.0	227.1	224.7	214.3	214.1	227.8	230.3	234.5
1952	239.8	254.3	254.2	258.8	254.4	239.2	241.3	261.5	263.8	267.7
June 1953	240.0	255.6	255.5	262.9	258.1	238.5	249.9	263.8	269.9	274.6
WASHINGTON, D. C.										
1926-29	106.6	107.7	107.9	107.1	105.9	106.0	104.0	108.0	106.4	108.4
1946	168.5	166.2	167.1	157.1	158.2	173.6	145.2	162.6	157.2	156.6
1949	223.1	223.3	223.1	213.5	212.6	227.2	194.8	218.6	210.4	214.6
1950	235.0	233.7	233.8	223.2	224.5	240.5	210.2	227.5	223.8	222.0
1952	259.0	258.2	258.2	245.6	246.5	265.4	232.4	251.0	248.0	245.3
June 1953	260.5	260.5	260.7	251.2	251.7	266.9	240.7	253.7	255.0	251.3

Current indexes are calculated upon an actual survey at source of local construction cost conditions. Material prices used are those paid by contractors to material dealers. Labor rates are current rates paid by contractors — certain corrections being made in certain areas for labor efficiency and labor shortage. Index includes construction overhead, sales taxes, compensation insurance and social security. The indexes have been primarily engineered to use as local cost conversion factors to construction cost data released by the Boeckh organization. Complete formula is published in "Boeckh's Index Calculator Tables."

Where Boeckh index is shown in these pages on charts or tables for comparison with other building cost indexes, the average for all five Boeckh commercial and factory building indexes is used, converted to 1913 = 100.

8,000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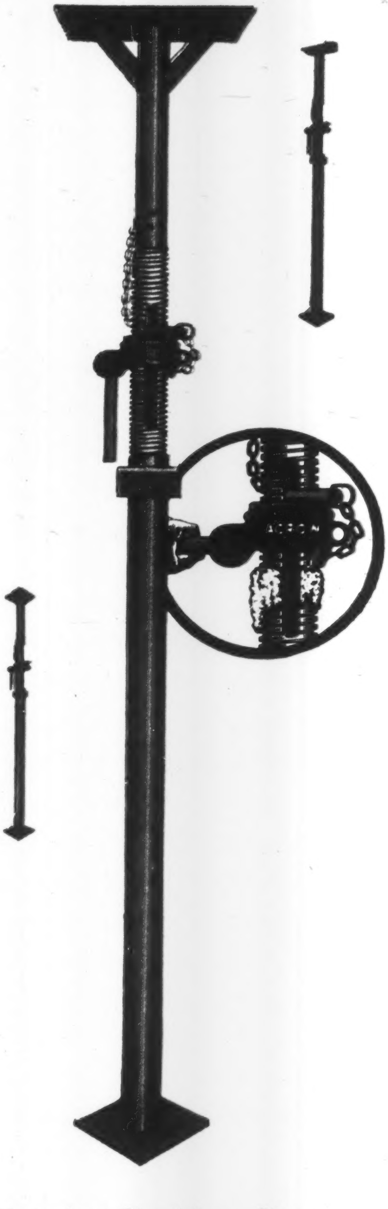

Photo shows Size 4 Acrow Shores being used 4′ on center, extended to 14′6″ under slab and steel pans.

ACROW SHORES used on "Pan" job

ACROWS SAVE TIME AND MATERIALS IN GRID FLAT SLAB SYSTEM OF CONSTRUCTION

Sordoni Construction Company of Wilkes-Barre, Pa., used over 8,000 Acrow Shores for erecting additions to the IBM Plant at Poughkeepsie, New York. No horizontal bracing was required because of the high loading capacity of Acrows. Acrows are quickly adaptable and highly recommended for any reinforced concrete slab system. For safe, sure support, specify Acrow adjustable Steel Shores.

ACROW

ADJUSTABLE
STEEL
SHORES

Acrows are safer, stronger, easier to handle. They are always ready for instant use. One man can erect an Acrow Shore in less than a minute, and strip it just as quickly. All-steel construction eliminates costly maintenance. Working loads are fully established and guaranteed. SELF-CLEANING patented stud on collar automatically clears the thread of concrete and dirt when adjustment handle is turned, assuring quick, easy stripping, and keeping the Acrow Shore ready for your next job.

GENERAL SPECIFICATIONS

Shore Sizes, Dimensions, Weights, and Capacities

HEIGHT				FAILING LOAD		RECOMMENDED SAFE WORKING LOAD	
Size No.	Fully Closed	Fully Extended	Weight in Lbs.	Fully Closed	Fully Extended	Fully Closed	Fully Extended
1	5 ft. 7 in.	9 ft. 10 in.	46	10.96 tons	8.97 tons	8210 lbs.	6720 lbs.
2	6 ft. 7 in.	10 ft. 10 in.	49	10.50 tons	7.90 tons	7840 lbs.	5975 lbs.
3	8 ft. 2½ in.	12 ft. 5½ in.	56	10.15 tons	7.55 tons	7490 lbs.	5600 lbs.
4	11 ft. 0 in.	15 ft. 0 in.	69	7.27 tons	2.89 tons	5800 lbs.	2050 lbs.

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The best type for use where floors are subject to extreme corrosion or moisture — chemical plants, breweries and other process industries. There are no cracks, open joints, or holes in bars. This type made only in mild steel.

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Most substantial and oldest design of grating made, permits perfect distribution of loads. Made on the truss principle, Borden Riveted Gratings are hydraulically power-forged for strength and durability. Particularly recommended for aluminum.

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Neat, clean, durable, easy to paint and maintain. Pressure Locked Design permits maximum passage of light, heat and air. It is especially desirable in power plants, boiler rooms and all dry area. Deep cross bars increase lateral support.

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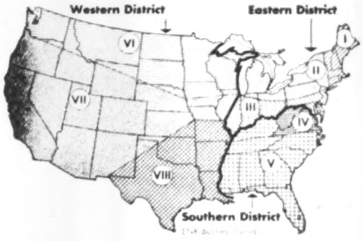


Railroad cost index road construction

ICC—1910-14 = 100

Dist & Reg.	%	1926	1932	1939	1945	1949	1951	1952
I to VIII	**68.40**	**166**	**131**	**137**	**197**	**270**	**298**	**308**
I East	73.72	173	134	140	206	287	310	323
II East	66.47	168	133	141	202	283	311	320
III East	65.37	168	132	144	205	286	312	325
IV South	63.48	163	126	131	195	259	290	299
V South	68.79	164	129	136	195	265	294	304
VI West	72.27	164	129	132	190	253	284	296
VII West	68.79	166	131	133	188	256	287	296
VIII West	71.97	167	133	140	198	270	295	305

Indexes represent territorial index factors and are not for determining unit reproduction costs for individual roads.

By Accounts	1926	1932	1939	1945	1949	1951	1952
Engineering	166	131	137	197	270	298	308
Other rt of way exp.	159	121	135	201	258	298	308
Grading	153	106	90	144	139	148	149
Tunnels & subways	178	119	140	236	339	365	380
Brdg, culv & trestl	170	122	149	240	374	405	433
Elevated structures	165	129	149	249	382	428	466
Ties	173	144	158	241	302	344	357
Rails	144	140	136	152	245	278	285
Other track material	177	163	167	176	278	301	307
Ballast	175	146	143	181	254	268	277
Trk laying & surf.	188	164	165	273	366	386	411
Fences snw sheds	178	147	141	189	279	320	333
Stat & off bldgs.	184	141	166	244	368	412	426
Roadway buildings	187	140	162	258	386	419	428
Water stations	182	147	166	227	327	359	367
Fuel stations	180	144	159	242	357	390	401
Shops & eng houses	185	137	165	248	379	419	432
Grain elevators	190	137	164	236	367	412	423
Storage warehouses	189	137	166	253	377	426	439
Wharves & docks	177	136	153	255	350	391	410
Coal & ore wharves	174	136	153	236	341	378	393
Tel & tel lines	157	121	129	173	250	290	300
Sgnls & intrlocks	169	130	143	176	226	266	271
Power plants	186	138	167	246	386	436	456
Powr trnsmissn sys	176	143	148	180	266	310	322
Misc struct	186	141	161	229	378	421	433
Roadway mach	151	138	154	187	270	319	320
Roadway small tools	190	155	180	200	315	380	385
Public impr const	169	131	142	217	321	347	356
Shop mach.	186	155	202	236	324	374	375
Power plant mach.	186	155	180	191	242	284	290
Work equipment	180	165	200	254	348	394	400

Ratio of RR costs, 1952

	%
Road construction	68.40
Equipment, work	0.49
Equipment, rolling & floating	24.54
General	6.57
Total	100.00

Indexes released August 24, 1953, by Engineering Sect. Bu. of Valuation, Interstate Commerce Commission, include items developed from analysis of major construction contracts over a period of years. Indexes for material accounts are based on studies of carriers' returns to Valuation Order 14, joint studies made with various sub-committees of President's Conference Committee, well-known engineering and trade publications, contracts covering major construction projects and other information furnished by individual carriers.

Handy-Whitman Index—public utility construction costs

Compiled and published by Whitman, Requardt and Associates, Baltimore, Md.

Individual series for 95 cost elements in three classes of utility construction, for six geographic divisions of the United States, are reported semi-annually. Weighting is based on wide experience in cost analysis of plants and construction. Material prices from ENGINEERING NEWS-RECORD, Iron Age and various manufacturers; labor rates from utilities, unions and builders associations.

Cost trends of building construction—1911 to 1914 = 100

(Complete Index reports 14 Items entering into Building Construction Costs.)
A relates to Reinforced Concrete Bldg.; B relates to Brick Bldg.

	Jan. '26	July '26	Jan. '32	July '32	Jan. '39	July '39	Jan. '42	July '42	Jan. '45	July '45	Jan. '47	July '47	Jan. '49	July '49	Jan. '50	July '50	Jan. '51	July '51	Jan. '52	July '52	Jan. '53	July '53
North Atlantic Division																						
A	213	213	171	159	205	207	250	253	259	260	336	353	436	433	437	448	473	479	481	485	496	519
B	228	229	189	173	211	214	246	250	262	265	329	351	429	421	424	436	460	474	474	479	485	503
South Atlantic Division																						
A	213	215	171	164	204	205	260	267	274	275	375	382	462	453	465	469	491	510	510	517	527	556
B	226	228	185	176	209	211	255	262	272	277	358	369	431	431	434	439	456	485	485	488	494	516
North Central Division																						
A	203	201	169	154	200	200	237	242	249	253	326	339	421	418	423	437	463	468	472	481	492	520
B	212	211	181	164	203	203	229	234	248	250	310	324	389	390	394	408	433	440	442	453	459	483
South Central Division																						
A	192	191	149	144	188	187	232	236	242	243	318	334	411	412	418	422	445	454	454	460	471	494
	203	204	160	154	191	191	223	227	235	238	299	322	382	382	387	392	408	424	426	438	445	460
Plateau Division																						
A	198	197	153	149	194	194	230	235	238	239	307	327	402	397	400	417	435	451	451	456	471	480
B	211	210	167	163	199	200	221	227	231	233	309	331	396	395	396	410	427	442	443	447	458	464
Pacific Division																						
A	191	190	157	148	192	192	238	241	248	248	328	343	416	415	420	432	458	463	466	468	477	501
B	198	197	164	156	193	193	226	231	241	242	303	329	386	385	389	400	419	435	438	443	448	466

Cost trends of gas plant construction—1911 = 100

(Complete Index reports 17 Items entering into Gas Plant Construction Costs.)
A relates to Total Constr. & Equip.; B relates to Mech. Equip. Exclusive of Gas Holders

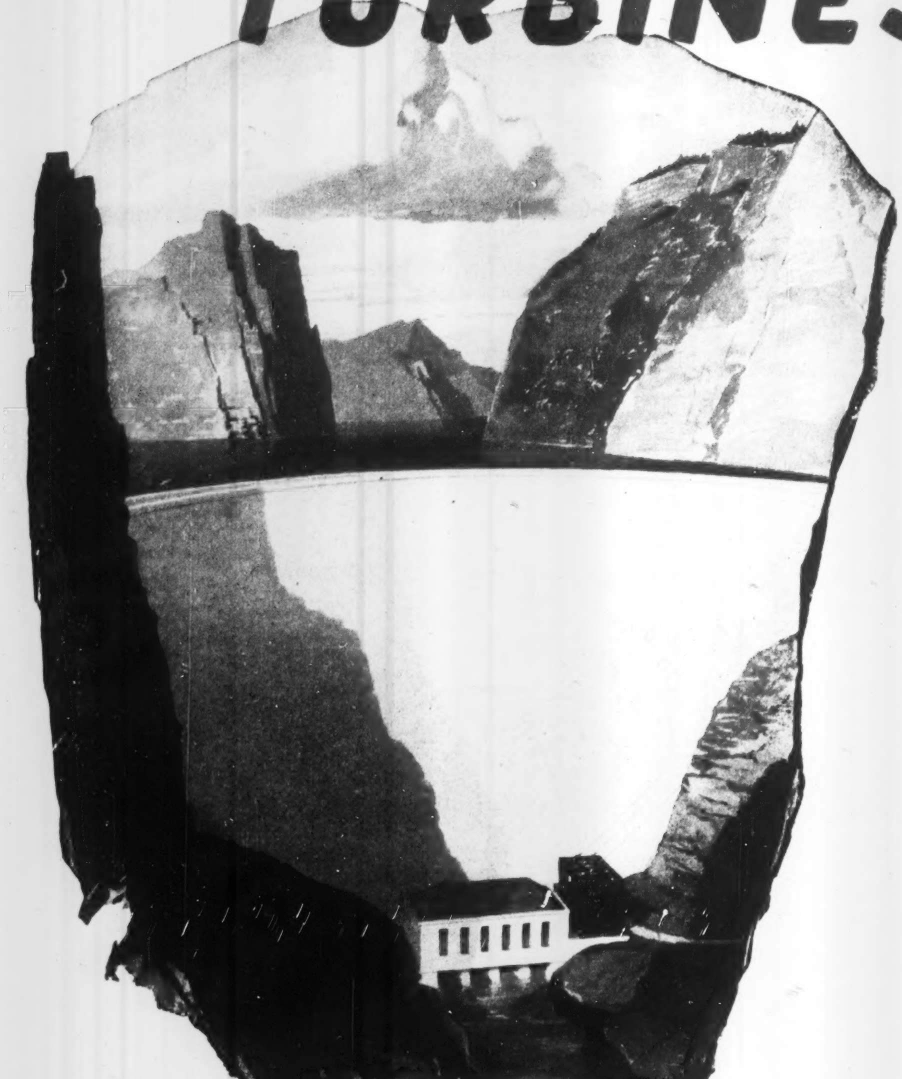
	Jan. '26	July '26	Jan. '32	July '32	Jan. '39	July '39	Jan. '42	July '42	Jan. '45	July '45	Jan. '47	July '47	Jan. '49	July '49	Jan. '50	July '50	Jan. '51	July '51	Jan. '52	July '52	Jan '53	July '53
North Atlantic Division																						
A	230	230	202	188	241	249	272	275	283	288	366	398	469	464	467	476	514	519	527	536	540	561
B	212	212	209	195	274	278	297	299	296	301	387	395	447	481	479	485	549	549	553	554	567	590
South Atlantic Division																						
A	219	222	178	175	227	230	261	268	278	282	363	388	464	453	456	457	492	507	510	520	525	543
B	212	212	209	195	274	278	297	299	296	301	387	395	481	482	479	485	549	549	553	554	567	590
North Central Division																						
A	217	218	198	178	232	232	249	254	264	269	335	367	435	434	437	447	481	489	491	503	508	531
B	212	212	209	195	274	278	297	299	296	301	387	395	447	481	479	485	549	549	553	554	567	590
South Central Division																						
A	199	200	171	160	216	217	244	249	258	261	335	359	420	419	425	429	465	470	474	475	479	496
B	212	212	209	195	274	278	297	299	296	301	387	395	447	487	479	485	549	549	553	554	567	590
Plateau Division																						
A	202	202	176	166	216	217	232	237	240	243	313	344	403	398	401	405	440	449	453	460	467	476
B	212	212	209	195	274	278	297	299	296	301	387	395	447	481	479	485	549	549	553	554	567	590
Pacific Division																						
A	205	206	187	177	227	228	253	257	264	266	342	369	433	428	433	437	475	480	489	491	498	516
B	212	212	209	195	274	278	297	299	296	301	387	395	447	481	479	485	549	549	553	554	567	590

Cost trends or electric light and power construction—1911 = 100

(Complete Index reports 64 Items entering into Electric Light and Power Construction Costs.)
A relates to Total Constr. & Equip. All Steam; B to Accessory Electric Equipment; C to Sub-sta. Equip.

	Jan. '26	July '26	Jan. '32	July '32	Jan. '39	July '39	Jan. '42	July '42	Jan. '45	July '45	Jan. '47	July '47	Jan. '49	July '49	Jan. '50	July '50	Jan. '51	July '51	Jan. '52	July '52	Jan. '53	July '53
North Atlantic Division																						
A	197	194	182	176	224	225	248	248	251	259	327	351	401	400	399	409	462	468	472	480	481	506
B	197	196	192	186	225	224	241	239	226	237	308	323	340	341	341	360	413	420	420	430	426	457
C	184	178	172	168	203	203	217	216	207	218	273	288	306	312	312	320	352	359	359	366	365	392
South Atlantic Division																						
A	201	201	188	180	232	233	262	267	268	273	336	362	430	422	422	430	482	490	494	504	506	536
B	200	203	200	191	239	240	260	262	247	248	305	324	357	356	358	374	426	431	432	442	438	474
C	187	183	180	173	217	218	235	237	227	228	270	289	322	325	327	333	365	370	370	377	377	409
North Central Division																						
A	190	187	186	174	219	218	235	238	238	243	299	324	375	374	374	382	436	443	446	456	458	489
B	189	188	199	186	224	223	229	231	216	218	272	289	309	307	310	324	376	382	388	391	388	419
C	178	171	181	169	203	202	207	209	198	200	240	257	278	280	282	286	320	326	328	333	332	359
South Central Division																						
A	184	183	179	171	218	218	245	246	248	251	310	336	391	390	390	398	448	454	458	465	468	496
B	187	189	200	190	231	230	250	248	235	235	290	311	341	340	340	357	407	415	416	423	420	453
C	175	171	181	173	210	209	226	226	217	217	257	278	310	311	311	319	344	352	352	356	356	385
Plateau Division																						
A	190	188	177	171	218	219	234	236	238	241	300	329	378	378	376	386	436	443	447	454	460	482
B	197	196	194	188	231	232	237	236	225	225	279	302	322	323	323	341	390	399	401	408	407	437
C	185	177	175	171	209	211	213	212	207	207	246	269	289	294	294	302	332	341	342	347	348	374
Pacific Division																						
A	180	178	172	163	216	215	235	242	242	244	300	332	383	380	379	389	440	450	454	459	461	486
B	178	177	182	170	222	222	231	240	225	225	275	303	328	323	323	343	394	408	409	413	409	437
C	167	161	164	155	203	202	210	219	208	208	244	272	298	297	297	307	342	357	357	359	358	382

FRANCIS TURBINES



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POWER by SMITH

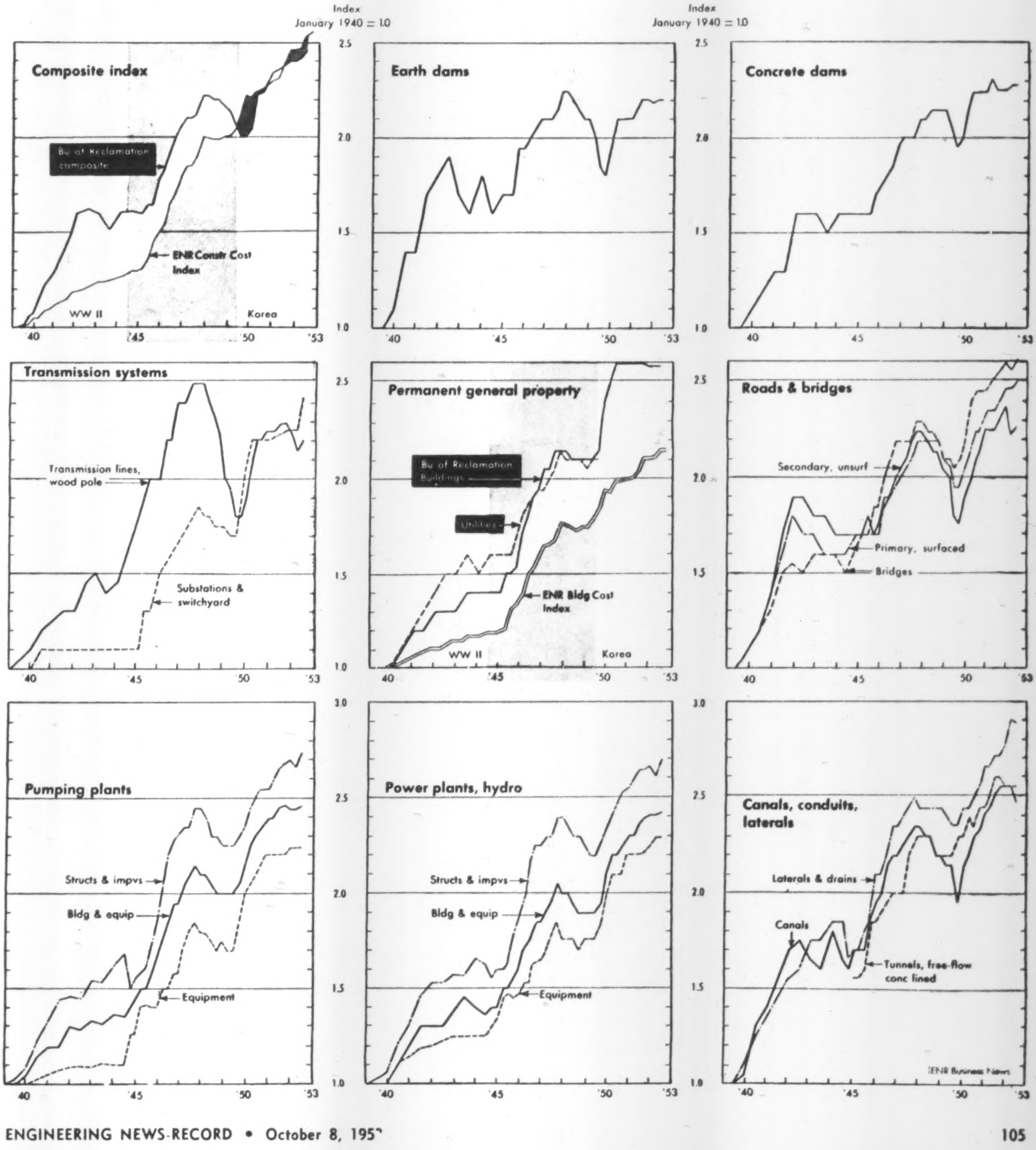
Irrigation and hydro-power construction cost indexes—1949-51=1.0

U. S. Bureau of Reclamation, Design and Construction Division, Denver, Colo.

	Multiplier to convert to 1940 = 1.00	1952 July	1953 Jan	1953 Apr	1953 July
Composite Index	2 12	**1 12**	**1.13**	**1.14**	**1 16**
Dams, earth	2 00	1.10	1.09	1.10	1 10
Dams, concrete	2 11	1.07	1.07	1 08	1 08
Pumping plants, bldg & equip	2.06	1.19	1.18	1.18	1.19
struct, reinf concr, & imprv	2 31	1.15	1.17	1.15	1.18
equipment	1 81	1 22	1 23	1.23	1 23
pumps & prime movers	1 80	1.22	1.28	1.28	1.28
acces elec & misc equip	1 86	1.18	1 12	1.13	1 15
discharge pipes	2 18	1.19	1.21	1.21	1 25
Canals	2 16	1.16	1.18	1.18	1 14
Conduits, tunnels, free flow, concr lined	2 26	1 15	1.13	1.13	1.13
Laterals and drains	2 42	1 12	1 14	1.20	1 19

	Multiplier to convert to 1940 = 1.00	1952 July	1953 Jan	1953 Apr	1953 July
Primary roads	2.08	1 13	1.18	1 18	**1.19**
Secondary roads, unsurf	1.98	1 14	1 19	1 12	**1.14**
Bridges, steel	2 18	1.15	1 19	1.17	**1.20**
Power plants, hydro, bldg & equip	1 98	1.19	1 21	1.21	**1.22**
structs, reinf concr, imprv	2.28	1.16	1.17	1.15	**1.18**
equipment	1 83	1.20	1 23	1 25	**1.25**
turbines & generators	1.80	1.22	1.27	1.29	1.28
acces elect equip	1.84	1.20	1.15	1.16	1.18
misc equip	1.95	1.13	1.15	1.15	1.15
penstocks	2.18	1.19	1.21	1.21	1.25
Transm switchyards & substations	2.03	1.10	1.11	1.11	1.19
Transmission lines, wood pole 115 kv	2.02	1.13	1.11	1.06	1.09
Transmission lines, steel tower 230 kv	1.91	1.13	1.14	1.14	1.18
Permanent genl property, bldgs	2.26	1.15	1.14	1.14	1.14

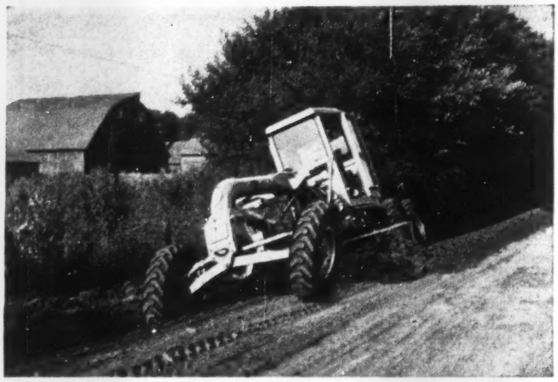
Based on combined costs of material and labor furnished by the contractor, and material and labor furnished by the government on B of R projects in 17 western states and Alaska



ENR Business News

Allis-Chalmers Construction Equipment

. . . helping small contractors and fleet owners to handle today's jobs at lower cost.



BETTER DITCHES result because an AD-40 operator can see graders front wheels and both ends of blade . . . because he has the advantages of Allis-Chalmers exclusive ROLL-AWAY moldboard.

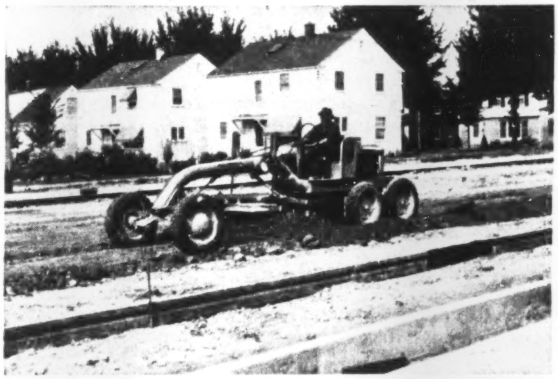
ROLL-AWAY is an Allis-Chalmers trademark.

BACKFILLING on a water main and sewer construction job is just one of dozens of ways cost-conscious contractors use the versatile HD-5 Crawler.

ONE-MAN CONSTRUCTION CREW. This HD-9G with two cubic yard shovel, shown rough-grading here, also lifts, dozes, digs, handles most bulk materials faster, better, more economically than before.

FLEET OWNERS GO ALLIS-CHALMERS, TOO. Contractors find the design advantages of Persian orange equipment bring more profit to their operations; and that rugged construction keeps it on the job longer. Now, to fit their jobs, they can select from seven scraper sizes . . . for use with any tractor.

HIGH-SPEED DIRT-MOVING TEAM loads and hauls big yardage on this large-scale operation. An Allis-Chalmers torque converter drive tractor helps load a trio of TS-200 Motor Scrapers and gives them a fast, smooth start from the cut. Quick to get moving, these hydraulically controlled Motor Scrapers speed to the fill with capacity loads up to 13 cu. yd., and with positive forced ejection, dump fast and clean.



FINISHING BETWEEN FORMS takes precision work. That's what this contractor is getting from his Model D . . . the low-cost motor grader, proved on dozens of jobs by thousands of users.

WIDENING ROAD. Owner found his HD-15 gives him up to 25 percent more output on short cycle dozing because operator can go from any forward to any reverse speed in just one lever shift.

DIGGING TRENCHES. This hydraulically controlled, front-end trench hoe is only one of a dozen attachments making the Allis-Chalmers HD-5G the most useful tractor in the world.

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The strength of steel is permanent and does not deteriorate with age or use.

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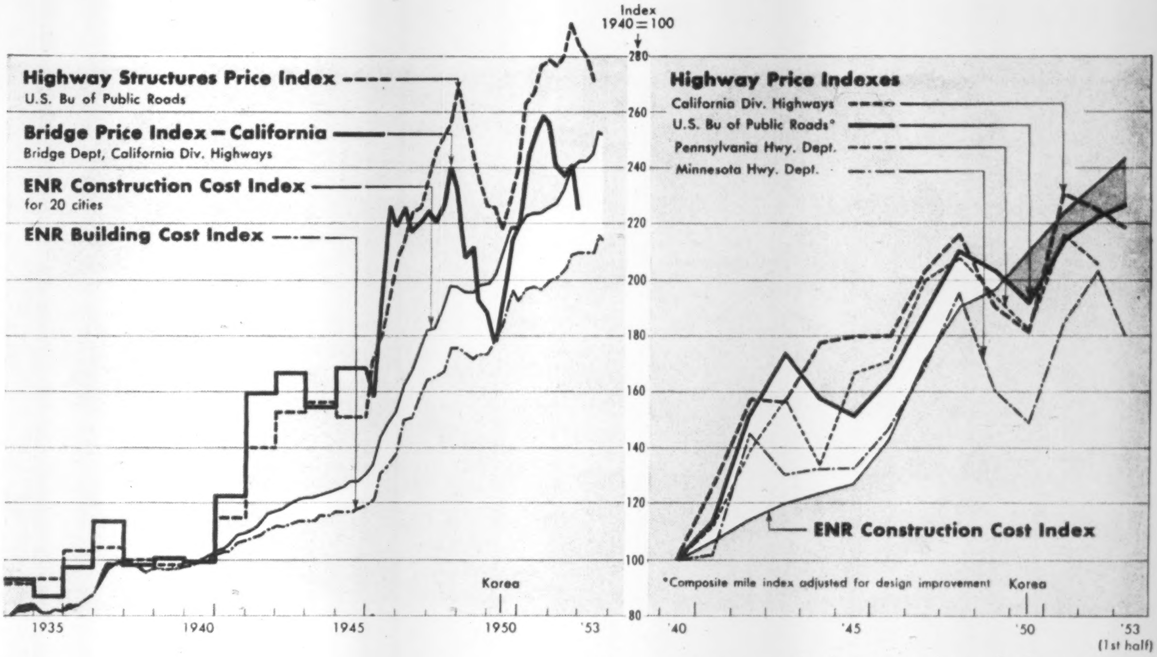

State highway bid prices turn down

Evidence rolls in that bid prices are down as construction costs continue up.

New this year, at this tread measuring job, are California's bridge price index and highway bid price indexes for Minnesota and Pennsylvania, shown in the chart above.

The bridge bid price trend is compared here with the highway structures price index from the Bureau of Public Roads' composite mile and also with ENR construction and Building cost indexes. This bridge price index was developed to measure the real size of California's bridge building program which in 1952 was over 5.6 times the 1939-40 rate in dollars invested and 2.37 times the base rate in physical volume of bridges built. This bridge price index is based on the quantities and prices shown in the table for 14 classes of work.

Along with its highway and bridge bid price indexes California keeps tabs on competition for highway contracts. In fiscal 1952-53, 691 prequalified contractors, with a combined bidding capacity of $1.35 billions, bid for 404 projects valued at $84 million. This is an increase of 39% since 1948 in accredited contractors. Contractors prequalified for the larger jobs let by the state have increased in numbers up to 80% since 1948.

In the past year alone, 13% more contractors have qualified for state work.

Bridge bid price Index

Division of Highways, State of California—1939-40 = 100

Base prices and weightings

Items of work Used in index		Total base contract quantities	Weighted average prices	Dollar values	Relative values %
Structure excavation	cy	156,286	$1.560	$244,398	3.24
Cl "A" portl cmt concr (structure)	cy	176,634	18.420	3,252,837	43.13
Cl "A" portl cmt concr (footing block)	cy	12,774	12.040	153,745	2.04
Struct steel (plate girder)	lb	5,810,000	0.077	450,221	5.97
Struct steel (rolled beam)	lb	4,953,000	0.063	310,900	4.12
Struct steel (truss)	lb	7,884,000	0.099	782,269	10.37
Misc iron and steel	lb	766,630	0.138	105,639	1.40
Bar reinf steel	lb	35,958,000	0.040	1,440,424	19.10
Furn steel piling	lf	79,329	1.790	142,168	1.88
Furn concr piling	lf	146,861	1.600	235,477	3.12
Driving steel piling	ea	2,313	25.290	58,490	0.78
Driving concr piling	ea	3,781	40.840	154,411	2.05
Steel bridge railing	lf	21,709	5.930	128,798	1.71
Concr bridge railing	lf	42,976	1.910	82,190	1.09
Total		......	......	$7,541,967	100.00

Bridge Price Index

Year	Index	Year	Index
1934	94	'48Q1	220
1935	88	'48 2	225
1936	98	'48 3	238
1937	114	'48 4	231
1938	99	'49Q1	207
1939	101	'49 2	210
1940	99	'49 3	191
1941	122	'49 4	187
1942	158	'50Q1	177
1943	165	'50 2	195
1944	153	'50 3	212
1945	167	'50 4	218
'46Q1	156	'51Q1	243
'46 2	190	'51 2	250
'46 3	224	'51 3	256
'46 4	217	'51 4	253
'47Q1	224	'52Q1	239
'47 2	216	'52 2	236
'47 3	219	'52 3	239
'47 4	223	'52 4	223

Highway price index and average prices

Division of Highways, State of California — 1940 = 100

	Rdwy excavt per c y	Crush run base per ton	Plant mix surf per ton	Asph conc pave per ton	PCC pavement per c y	PCC structures per c y	Bar reinf steel per lb	Structural steel per lb	Hwy const price index
1940	$0 22	$1 54	$2 19	$2 97	$7 68	$18 33	$0.040	$0.083	100.0
1941	0.26	2 31	2.84	3.18	7.54	23 31	0.053	0.107	125.0
1946	0 41	2 45	4 00	4.68	9.48	37.38	0.060	0 099	179.7
1948	0 55	2 43	4 30	5 38	13.04	49.86	0.092	0.126	216.6
1949	0 49	2 67	4 67	4.64	12.28	48 67	0.096	0.117	190.7
'50 Q 1	0 34	2 22	3 65	3 74	....	40.15	0.077	0.081	160.0
'50 2	0 40	2 13	4 48	3 74	10 86	43 03	0.080	0.105	180.0
'50 3	0 41	2 32	4 25	5 50	10 91	44.34	0 093	0.131	189.2
'50 4	0 42	2.81	4 64	4 61	12 55	43 18	0.098	0.120	194.8
'51 Q 1	0 45	3 07	4 06	5 22	11 71	46.38	0 103	0 206	215.4
'51 2	0 63	3 88	4 56	4 63	12 93	51 50	0 105	0.166	238 3
'51 3	0 56	2 88	4 59	3.90	12.41	46.14	0.107	0.165	221.9
'51 4	0 66	2 91	5 66	4 89	12 71	49.38	0.105	0.169	245 4
'52 Q 1	0 56	3 25	4 88	4.77	14 25	47 46	0.094	0.152	224.8
'52 2	0 53	3 19	5.29	4.13	14 20	49.12	0.091	0.143	224.4
'52 3	0 55	2 61	5 49	4.60	12.80	48.21	0.094	0.132	221.2
'52 4	0 66	2 68	4 97	....	12.53	48.45	0.094	0.128	226.2
'53 Q 1	0 45	2 48*	5 27	4 46	12.47	53.19	0.098	0.150	218.3
'53 2	0 50	2.07	5 38	4.59	13.06	52.68	0.091	0.152	217.5

* Untreated rock base substituted for crusher run base at this point.

CALIFORNIA'S highway construction price index is based on the average contract prices for the eight principal classes of construction shown in the accompanying table. The index is weighted each year according to the actual quantities of each of these contract items. The base is 1940=100, 1940 quantities multiplied by 1940 average contract prices. The price index for each period is computed by extending total quantities. Richard H. Wilson, Assistant state highway engineer, H. C. McCarty, Office engineer.

Competition on California highway construction

Average number of bidders per project

By size of project	By type project				Total prequalified contractors		Increase since 1948
	Road	Structures	Combined	All	7/1/53	7/1/48	%
up to $50,000	4.5	4.8	...	4.7	691	507	36
$ 50,000 to $ 100,000	5.0	6.9	...	5.6	607	382	59
$100,000 to $ 250,000	5.9	9.2	...	6.3	575	347	66
$250,000 to $ 500,000	5.8	9.0	...	6.8	481	...	..
$500,000 to $1,000,000	8.2	9.4	3.0	8.0	337	187	80
Over $1,000,000	7.4	9.3	8.0	7.9	233	137	70
All	5.2	7.2	7.0	5.7			

Average number of bidders by months

1951—'52—year, 5.3						1952—'53—year, 5.7					
First quarter			Second quarter			Third quarter			Fourth quarter		
	'52	'53		'52	'53		'51	'52		'51	'52
Jan	7.6	5.5	Apr	6.0	6.4	July	4.3	4.3	Oct	4.4	5.1
Feb	6.4	6.1	May	4.5	5.9	Aug	4.0	4.3	Nov	8.0	5.9
Mar	6.9	7.5	Jun	4.8	6.0	Sept	4.6	5.9	Dec	7.3	4.8

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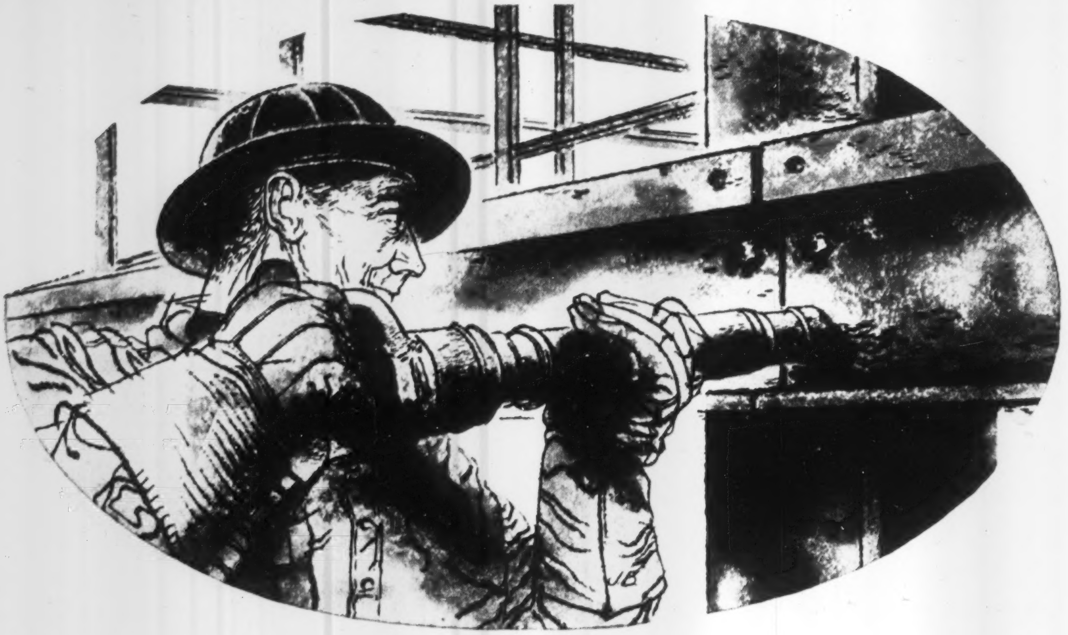

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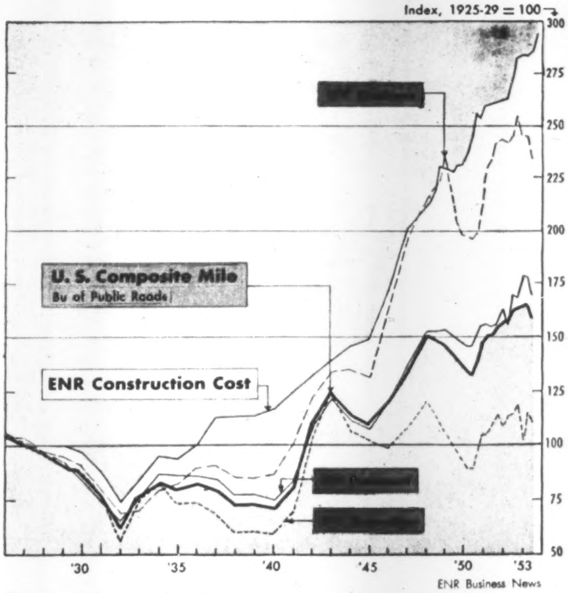


ENR Business News

Composite mile index revised

Thicker concrete pavements and compaction requirements in common excavation have caused unit prices to increase more than the trend based on unchanged specifications.

Accordingly, to compensate for this advance in the art, the Bureau of Public Roads has revised the excavation and surfacing components of its composite mile bid price index back through 1941, and thus has revised the index too, as shown on the accompanying table.

Excavation prices in this new index topped out in mid 1952 and have receded 5% from that high mark. Concrete surfacing prices topped out in the 4th quarter of 1952 and have since backed down 6%. Structures prices topped out in the third quarter of '52 and are now down 7%.

Highway price index—composite standard mile

U. S. Bureau of Public Roads, 1925-29 = 100

Year		Excavation¹ 17,491 cy* Bid Price³	Excavation¹ 17,491 cy* Sub-index	Surfacing² 3,726 sy* Bid price³	Surfacing² 3,726 sy* Sub-index	Structures: Reinf. Steel 16,000* lb. Bid price³	Structures: Struct. Steel 4,325* lb. Bid price³	Structures: Struct. concr. 68* cy Bid price³	Comb. Sub-index	Composite mile index
Base '25-29		$0 35†	100 0	$2 22†	100 0	$0 052†	$0 067†	$22 15†	100.0	100 0
1926		.36	103.7	2.29	103.1	053	074	22.76	103.7	103.4
1930		.30	86.3	1.86	84.1	045	061	20.08	89.4	85.7
1932		.18	55.0	1.44	64.8	034	046	15.33	68.0	61.0
1939		.21	59.8	1.73	77.8	044	059	19.13	85.9	72.6
1940		.21	59.2	1.68	75.6	045	063	19.17	87.6	71.6
1941	R	.24	69.2	1.87	84.1	054	076	21.44	100.8	81.4
1942	R	.37	104.1	2.39	107.9	065	090	26.16	122.3	108.8
1943	R	.44	124.0	2.71	122.3	067	095	30.19	134.4	124.9
1944	R	.37	106.6	2.45	110.6	064	089	31.94	136.5	113.1
1945	R	.36	101.6	2.38	107.4	062	077	31.62	132.5	109.0
1946	R	.35	99.1	2.65	119.3	075	113	38.79	164.7	119.0
1947	R	.38	108.4	3.01	135.5	093	132	45.84	196.9	135.0
1948	R	.42	119.3	3.37	151.9	.108	158	51.00	223.9	151.2
1949	R	.38	107.4	3.40	153.1	.104	146	47.36	210.3	145.8
1950:		**.33**	**94.5**	**3.32**	**149.8**	**.100**	**.139**	**44.62**	**199.4**	**137.**
1Q	R	.31	88.6	3.24	146.1	.096	.133	44.96	197.0	133.5
2Q	R	.31	89.5	3.23	145.6	.096	.133	42.61	191.0	132.5
3Q	R	.33	94.9	3.34	150.6	.100	.137	44.66	199.4	138.1
4Q	R	.37	104.8	3.48	156.9	.106	.154	46.25	210.0	146.7
1951:		**39**	**110.0**	**3.54**	**159.5**	**.120**	**.180**	**52.07**	**237.8**	**153.7**
1Q	R	37	106.3	3.51	158.3	,116	.180	50,12	230.4	150.6
2Q	R	.39	111.4	3.48	156.9	.119	.170	51.45	234.0	152.4
3Q	R	.40	113.7	3.51	158.3	.122	.182	53.21	242.5	155.1
4Q	R	.38	108.5	3.65	164.6	.123	.187	53.51	244.3	156.7
1952:		**40**	**114.2**	**3.80**	**171.3**	**.124**	**.186**	**54.50**	**247.8**	**162.5**
1Q	R	40	112.8	3.71	158.3	.123	.184	52.97	242.5	159.3
2Q	R	.41	115.4	3.78	170.4	.122	.175	54.80	245.5	162.1
3Q	R	.41	117.9	3.74	168.6	.126	.195	56.55	255.4	163.6
4Q	R	39	110.5	3.97	179.0	.126	.191	53.69	247.7	164.9
1953:										
1Q	R	40	114.8	3.96	178.5	.121	192	53.91	245.4	165.9
2Q	R	.39	112.0	3.73	168.2	.120	.180	51.67	237.1	158.5

•¹ Common excav. plus other excav. items expressed as equivalent common excav.
•² Portland-cmt. concr. plus other surfacing expressed as equivalent portland-cmt. concr.
•³ Calculated to one more decimal place than shown in this table. •* Fixed quantities used for establishing composite mile for price trend. •† Prices used for establishing composite mile index bases. • R—revised since previous publication, see text.

State highway price indexes

Continued from preceding page

Pennsylvania Department of Highways uses annual yearly average bid prices in its highway price index based on 1940 = 100. Quantities for a typical project are used and repriced by weighted average unit prices bid on these units by successful contractors within the calendar year for which the data is shown.

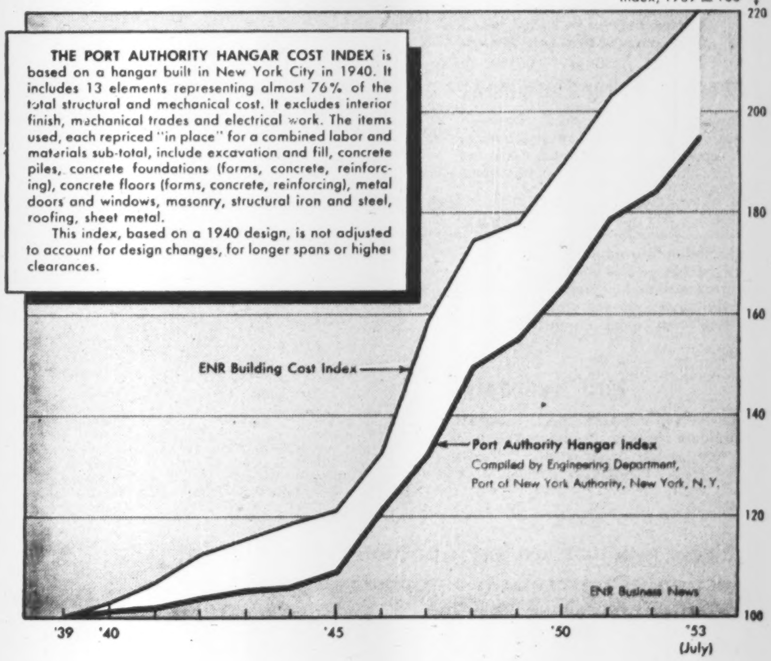
Minnesota Highway Department bases its construction price index on a composite mile that represents average types of work and quantities of materials involved in a normal, balanced construction program.

California and Pennsylvania bids topped out in 1951 and have been dropping consistently since. Minnesota prices topped out in the first half of 1952.

The first turndown in the Bureau of Public Roads composite mile revised index does not appear until the second quarter of 1953.

Lower bids in the face of rising costs mean either greater productivity or lower profits or some of each.

Hangar cost index–1939=100


THE PORT AUTHORITY HANGAR COST INDEX is based on a hangar built in New York City in 1940. It includes 13 elements representing almost 76% of the total structural and mechanical cost. It excludes interior finish, mechanical trades and electrical work. The items used, each repriced "in place" for a combined labor and materials sub-total, include excavation and fill, concrete piles, concrete foundations (forms, concrete, reinforcing), concrete floors (forms, concrete, reinforcing), metal doors and windows, masonry, structural iron and steel, roofing, sheet metal.

This index, based on a 1940 design, is not adjusted to account for design changes, for longer spans or higher clearances.

Index, 1939 = 100
220
200
180
160
140
120
100
ENR Building Cost Index
Port Authority Hangar Index
Compiled by Engineering Department,
Port of New York Authority, New York, N. Y.
'39
'40
'45
'50
'53
(July)

ENR Business News

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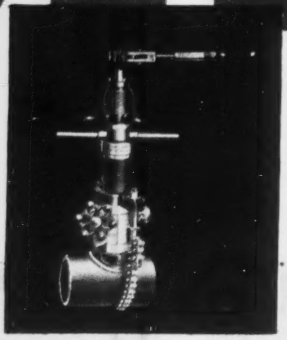
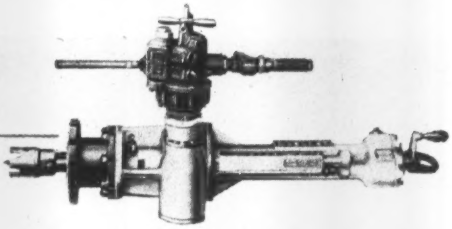


"C-1" Drilling Machine

Makes cuts 2" to 12" in any size main...dry or under pressure...power-operated with H-600 Air Motor or H-602 Gasoline Engine Drive Unit...hand-operated model also available.



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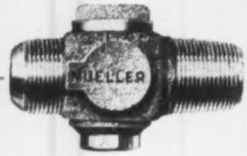
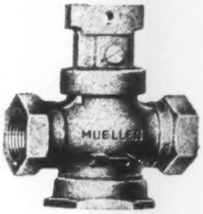
Designed for insertion in mains under pressure with Mueller Tapping and Inserting Machines...wide range of sizes and types...variety of inlet threads...fully tested.



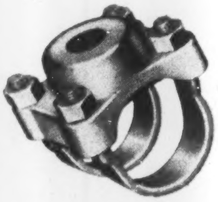
Curb Stops

Ground key stops...steeper taper on key prevents sticking and allows easy operation...inverted key or solid tee head type available...wide range of sizes...fully tested.



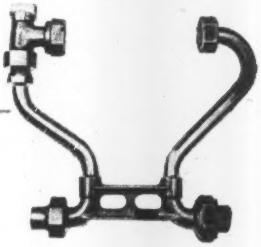
Service Clamps

Designed for cast iron, steel, asbestos cement, or wrought iron pipe...double or single strap...full length threads...neoprene or lead ring gaskets...wide range of sizes and tappings.



Meter Setting Equipment

Copper or iron meter yokes...flat head or lock wing angle stops...meter couplings...complete line available...variety of threads and outlets.



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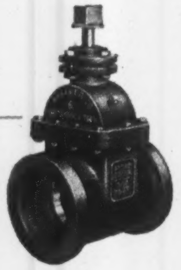

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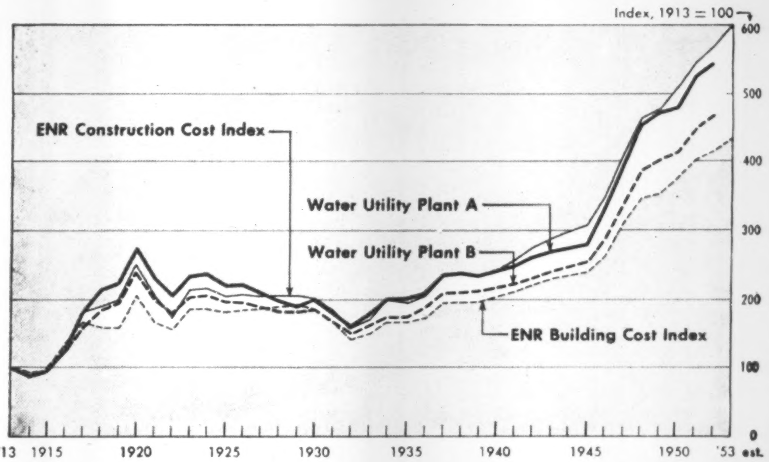


Cost indexes tailored to water works properties

To fit a special cost index to the peculiar characteristics of any individual water works property, Henry H. Fick has come up with seven component indexes, one for each major class of water works plant investment. These can then be weighted and combined to fit the make-up of a specific property.

The way this works is illustrated by the two water utility plant cost indexes, A and B, as shown in the chart. These two plants differ in the ratio of mains to buildings or of services to reservoirs. For example, the distribution of the cost of each plant in each of the seven components is shown in the accompanying table.

The seven component cost indexes are designed to show historic cost trends in each of these plant components. They are reported in full in a paper presented to the Pennsylvania Section of the American Water Works Association and published in the AWWA Journal, August 1953.

These component indexes are based on the thirteen recognized cost indexes shown in the accompanying table for selected years.

The two sample water utility cost indexes shown, A and B, illustrate the effects of historical price changes upon two systems with identical kinds but dissimilar amounts of property.

The basic components of the two systems reflect the approximate dispersion of various classifications of property of two existing Pennsylvania utilities. For simplicity, however, it has been assumed that: 1, all structures are made of brick and concrete; 2, the transmission and distribution systems are composed of cast-iron mains; 3, services are constructed of wrought-iron pipe; and 4, equipment includes motors, pumps, office, and contractors' items.

Cost distribution, two typical plants

Component	Plant A %	Plant B %
Land	1	13
Reservoirs	5	17
Buildings	10	25
Pumps, motors, etc.	5	5
Mains	60	32
Services	10	2
Meters	7	4
Other equipment	2	2
Total	100	100

Plant A, having 60 per cent of its entire property in the form of distribution mains, has higher index numbers than Plant B, except for 1914. Plant B, which can be compared to a water works in a large city, has more land, reservoirs, and filtration and pumping plant structures than Plant A and therefore has lower index numbers. It may be of interest to note that the Handy-Whitman annual index figures for gas utilities in the North Atlantic Division, when converted to a 1913 base, fall between the two typical water works indexes in 33 of the 41 years and in all years since 1932.

The index numbers for the two plants vary considerably over a long period, but, if the indexes for the two plants during 1943-52 are converted to a 1943 base, they show relatively greater uniformity in reflecting the progressive price increases of the period. The average of the indexes for plants A and B in the 10-year period, when compared to indexes of other properties computed in a more detailed fashion, varied at most only 2.8 per cent in any one year, with an average annual variation (excluding the base year) of only 0.4 per cent.

It is believed that, with the exception of systems composed entirely of distribution facilities, water utilities will generally have cost indexes within the range of indexes of plants A and B. The latter, however, only suggest and do not specifically indicate the fluctuations in construction costs for a particular water works.

Waterworks property cost index components

Henry H. Fick, Weber, Fick & Wilson, Public Utility Consultants, Harrisburg, Pa.—
1913 = 100

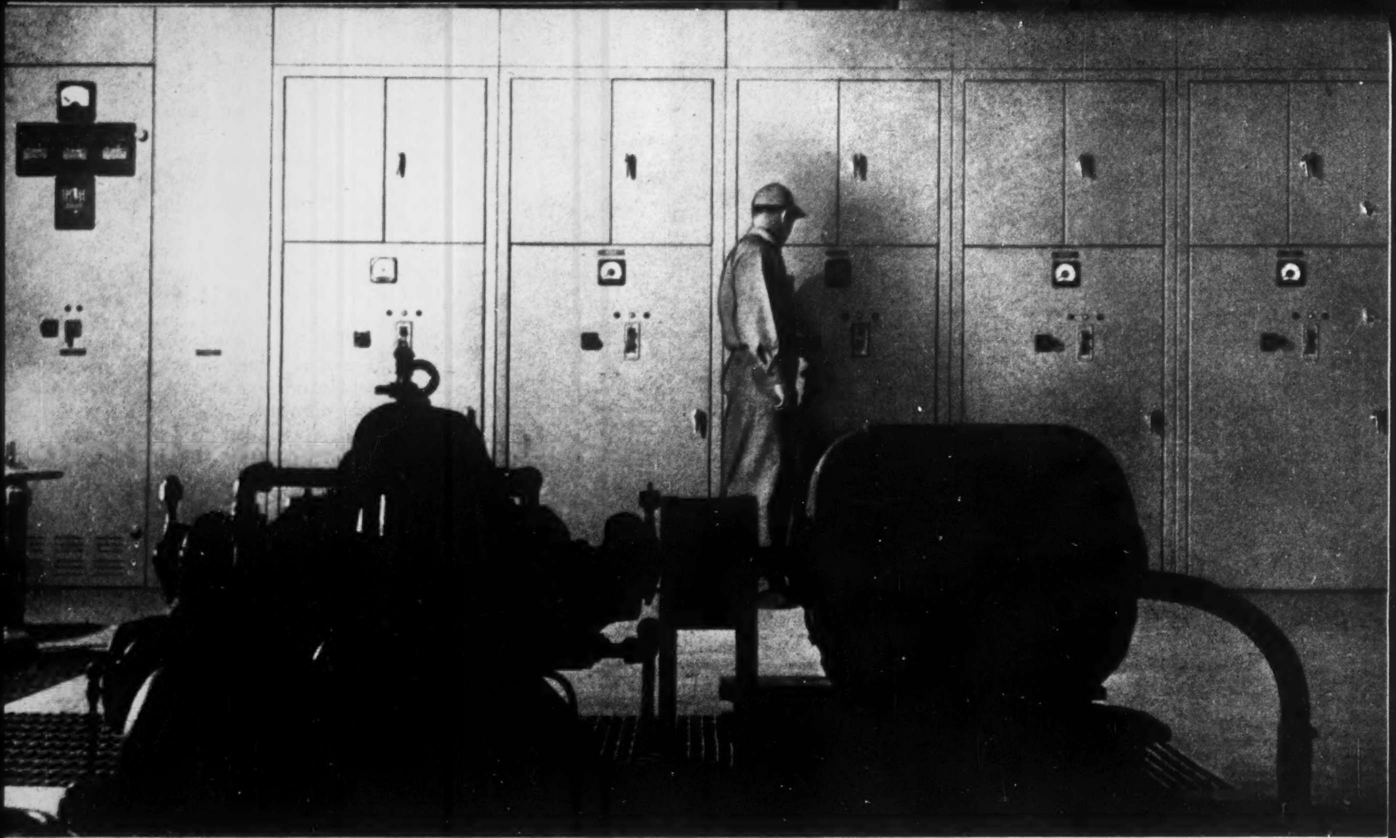
Year	Reservoirs	Buildings	Pumps and Motors	Distribution System	Services	Meters	Other Equipment
1926	208.0	210.3	134.2	237.0	269.1	175.0	147.0
1932	157.0	161.7	134.0	158.5	226.7	168.7	107.1
1939	235.5	223.9	147.8	257.0	283.6	168.8	126.9
1940	242.0	224.2	147.0	266.8	287.2	169.7	129.7
1941	257.8	229.9	147.0	273.7	297.2	189.8	140.0
1942	276.3	239.8	154.0	283.3	311.0	201.9	151.6
1943	289.9	247.9	154.0	291.1	322.0	204.5	152.5
1944	298.7	261.8	145.8	295.2	327.9	205.9	154.4
1945	307.7	278.2	148.2	300.1	334.9	207.5	155.9
1946	346.0	298.7	173.8	358.5	376.0	222.5	185.1
1947	413.2	341.0	210.0	428.8	435.8	235.6	225.3
1948	460.7	394.9	218.8	504.7	498.8	288.9	242.2
1949	477.0	413.2	232.0	523.8	545.3	315.6	237.0
1950	509.1	421.4	251.2	520.1	568.3	336.4	246.3
1951	542.0	448.1	297.0	581.3	603.4	364.5	249.0
1952	568.9	467.1	296.5	605.3	633.6	401.7	248.8
Dec. 1952	587.5	477.4	295.0	627.9	662.0	405.8	249.3

Indexes used to develop Fick water works property component cost indexes

Indexes, 1913 = 100

	1926	1932	1939	1940	1949	1952	Dec. 1952
Building							
Engineering News-Record Building Cost Index	185.0	140.9	197.4	202.8	351.8	415.6	425.3
E. H. Boeckh & Assoc brick & concrete commercial & factory bldg, Pittsburgh, Pa area	210.3	161.7	223.9	224.2	413.2	467.1	477.4
ICC Railroad Construction Index, station & office buildings, Group III (1910-14 = 100)	184.0	141.0	166.0	177.0	368.0	426.0	....
Handy-Whitman brick buildings index, North Atl. Div.	229.0	175.3	214.0	218.3	423.8	479.2	485.0
Materials							
6-in & larger cast-iron pipe, based on Iron Age Index, New York City	215.0	130.1	213.1	223.4	421.3	472.7	487.8
1½-in wrought-iron pipe, based on Handy-Whitman index, North Atlantic Div	254.5	228.2	226.4	226.4	380.9	421.5	410.0
Motors, based on Handy-Whitman index, North Atl. Div	134.2	134.0	147.8	147.0	232.0	296.5	295.0
Contractors' equipment, based on Marshall & Stevens index	158.7	114.1	130.8	132.4	255.7	282.2	283.0
Office equipment, based on Marshall & Stevens index	136.8	101.1	123.5	127.2	220.9	247.2	247.3
Meters, private sources	162.5	162.5	147.7	147.7	265.9	310.2	310.2
Common Labor, based on Engineering News-Record labor index, 20-city average	288.4	221.7	359.5	367.9	763.2	914.7	956.3
Construction, based on Engineering News-Record Construction Cost Index	208.0	157.0	235.5	242.0	477.0	568.9	587.5
Gas utility costs, based on Handy-Whitman index, North Atlantic Div	212.0	174.5	229.6	235.2	432.9	495.4	500.0

Journal, American Water Works Association, August, 1953



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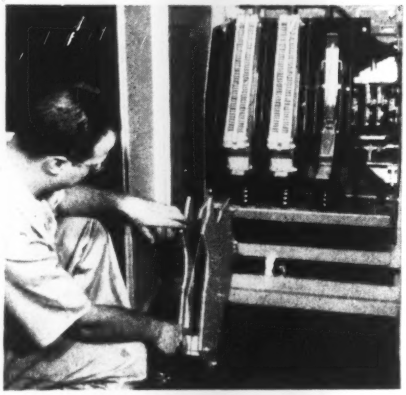

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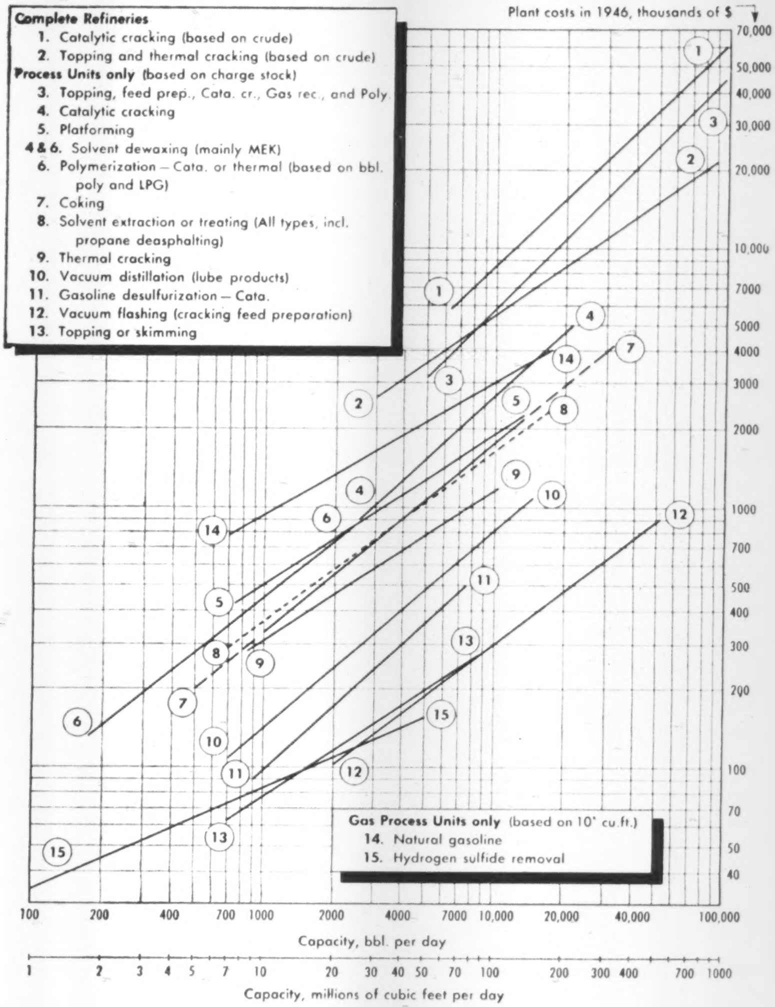


Petroleum refinery costs and Nelson refinery construction index--1946=100

Compiled by W. L. Nelson, Petroleum Refinery Engineering Consultant and published by Oil & Gas Journal, Tulsa, Oklahoma

	1926	1932	1939	1942	1945	1946	1947	1948	1949	1950	1951	1952	June 1953
NELSON Refinery Construction Index = 1946 = 100	*72.0	*56.6	*76.6	*83.7	*89.9	100.0	117.0	132.5	139.7	146.2	157.2	163.6	172.1
Components.													
Heat exchangers	75.0	60.0	76.0	93.5	91.9	100.0	115.0	130.0	133.0	140.0	152.0	165.8	172.4
Instruments (control)	....	90.0	89.5	85.5	90.6	100.0	113.0	120.0	122.0	127.8	142.3	146.2	148.1
Pumps, compressors, etc	....	....	91.5	87.5	93.9	100.0	116.3	127.0	135.9	138.2	155.9	155.6	162.8
Electrical equipment	81.0	57.0	68.5	74.0	81.8	100.0	113.0	127.6	130.9	134.9	154.3	152.4	156.1
Internal combustion engines	....	....	84.5	84.5	91.7	100.0	109.0	116.9	124.8	126.0	146.1	146.5	147.8
Miscellaneous equipment average	*94.0	*79.0	*82.0	*85.0	*90.0	100.0	†114.2	†122.1	†121.6	†126.2	†145.1	153.3	157.4
Materials component	....	68.0	82.0	86.3	89.7	100.0	122.4	139.3	143.6	149.5	164.0	164.3	171.6
Labor component	....	49.0	73.0	82.0	90.0	100.0	113.5	128.0	137.1	144.0	152.5	163.1	172.4

* Approximate, if projection back to these dates from other cost sources.

† Used to compute index until Apr 1952. Slightly different from the average of the miscellaneous equipment items shown Equipment prices, mainly from manufacturers as quoted to Oil & Gas Journal •Materials Component from Bureau of Labor Statistics Wholesale Price Index, Code 10-1 Iron and Steel and Code 13, Building Materials •Labor, half skilled and half common labor as quoted by Engineering News-Record.

The Nelson Index applies to the costs of constructing petroleum refinery and natural gasoline plants since 1946 and projected back to 1926. It is published each month in the Oil and Gas Journal and is based on quotations from manufacturers on equipment used extensively in petroleum refineries and on proportions of steel, common building materials and labor that represent average refinery constructions.

How to compute the Nelson index

The Materials Component consists of two items from the Bureau of Labor Statistics "Wholesale Prices," U. S. Department of Labor (Code 10-1 Iron and Steel, and Code 13 Building Materials), and a miscellaneous equipment average obtained mainly from manufacturers and published each month on the Refinery page of the Oil and Gas Journal in the Nelson Refinery Construction Index box. The costs are percentages of the cost in the year 1946. The Materials Component (40% of total index) for the month of March 1952 may be computed as follows:

Bur. of Labor	Iron and steel	Building materials
1946 index	71.0	69.1
March 1952 index	123.2	112.9
Index relative to 1946	166.5	163.4

Iron and steel 0.6 × 166.5 = 99.9
Building materials 0.2 × 163.4 = 32.7
Miscellaneous* 0.2 ×* 145.2 = 29.0

Materials component 161.6

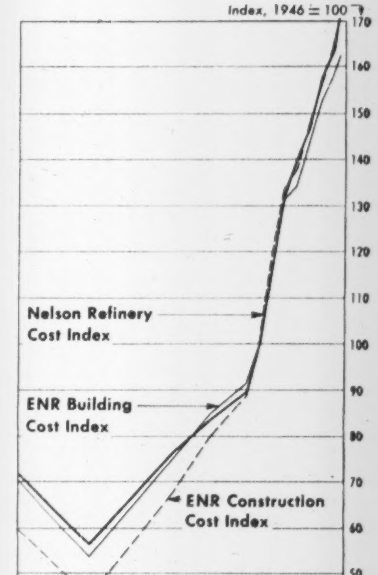
* See the Oil and Gas Journal Refinery page, July 7, 1952

The labor component is half skilled and half common labor, taken from the Engineering News-Record:

Engineering News-Record	Skilled	Common
1946 wage rate	$1.80	$1.033
March 1952 wage rate	2.77	1.664
Index relative to 1946	153.9	161.1

Skilled 0.5 × 153.9 = 76.95
Common 0.5 × 161.1 = 80.55

Labor Component 157.5



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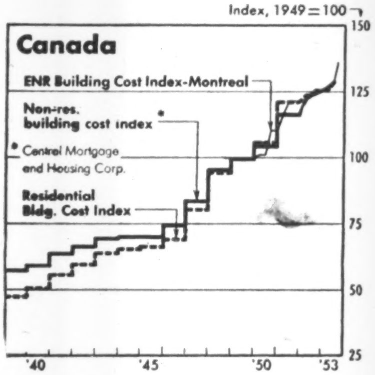
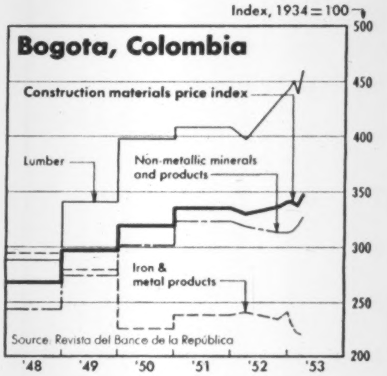
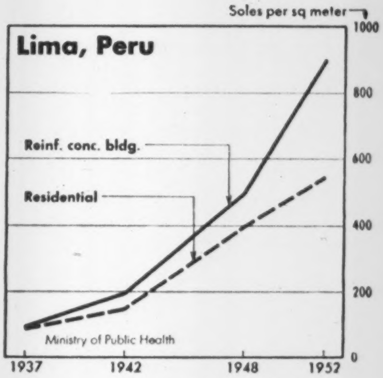




Source: Revista del Banco de la República



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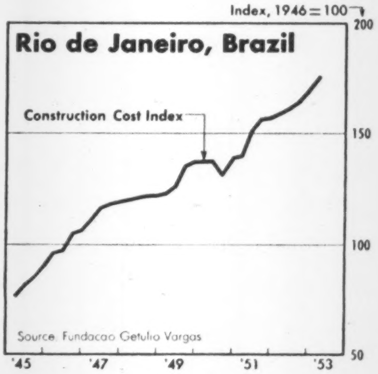
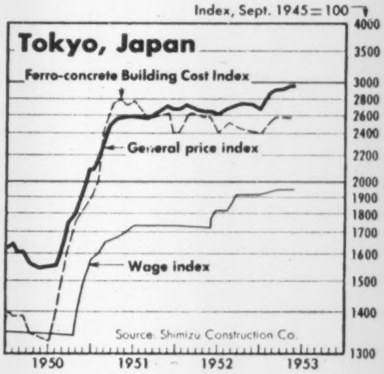
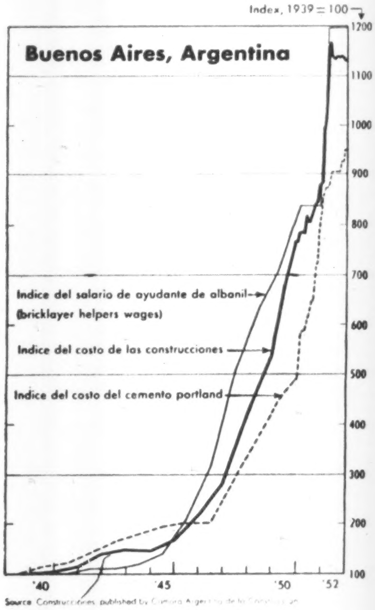


Source: Fundacao Getulio Vargas



Source: Shimizu Construction Co.



Source: Construcciones, published by Camara Argentina de la Construccion

Construction cost trends around the world

Cost and price indexes for 14 foreign countries which appear on these pages, most of them for the first time, show how this method of measuring construction cost movements has spread over the globe.

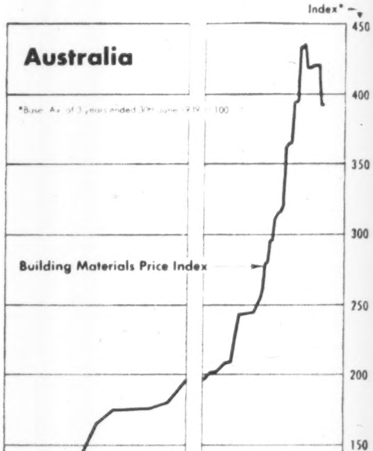
Nearly all of these indexes are similar to the ENR cost indexes in that they are the weighted aggregate type.

Canada—The Central Mortgage and Housing Corp. has revised its building cost index and switched to a new base year of 1949 = 100. This agency now compiles a cost index both for residential and for non-residential building. Both combine a weighted index of wholesale building materials prices with a wage rate index. The wage index includes workers' holiday pay allowances. Weights assigned to materials and wages in computing the residential cost index are 62.5% and 37.5% respectively, and 65% and 35%, in the non-residential cost index.

Lima, Peru—The costs, per square meter, of building an average home and a reinforced concrete building in this city are based on materials and labor costs.

Rio de Janeiro, Brazil—The building cost index measures the cost trend for constructing a 3-story building with 6

Continued on following page



*Base: Av. of 3 years ended 30th June 1939 = 100

Source: Commonwealth Bureau of Census and Statistics

Materials prices and wage rates in U. S. Territories and Possessions June '52 and June '53

Construction wages per hour

City	Common labor Hvy. constr. 6/53	6/52	Building 6/53	6/52	Bricklayers 6/53	6/52	Carpenters 6/53	6/52	Structural ironworkers 6/53	6/52
Anchorage, Alaska[a]	$3.095	$2.935	$3.06	$2.935	$4.195	$4.07	$3.565	$3.34	$3.84	$3.615
Honolulu, Hawaii[a]	1.36	1.30	1.36	1.30	2.00	1.87	2.40	2.25	2.40	2.25
San Juan, P. R.[a]	0.65	0.65	0.35[b]	0.35[b]	1.00[d]	1.00[d]	0.80[c]	0.80[c]	1.00[d]	1.00[d]

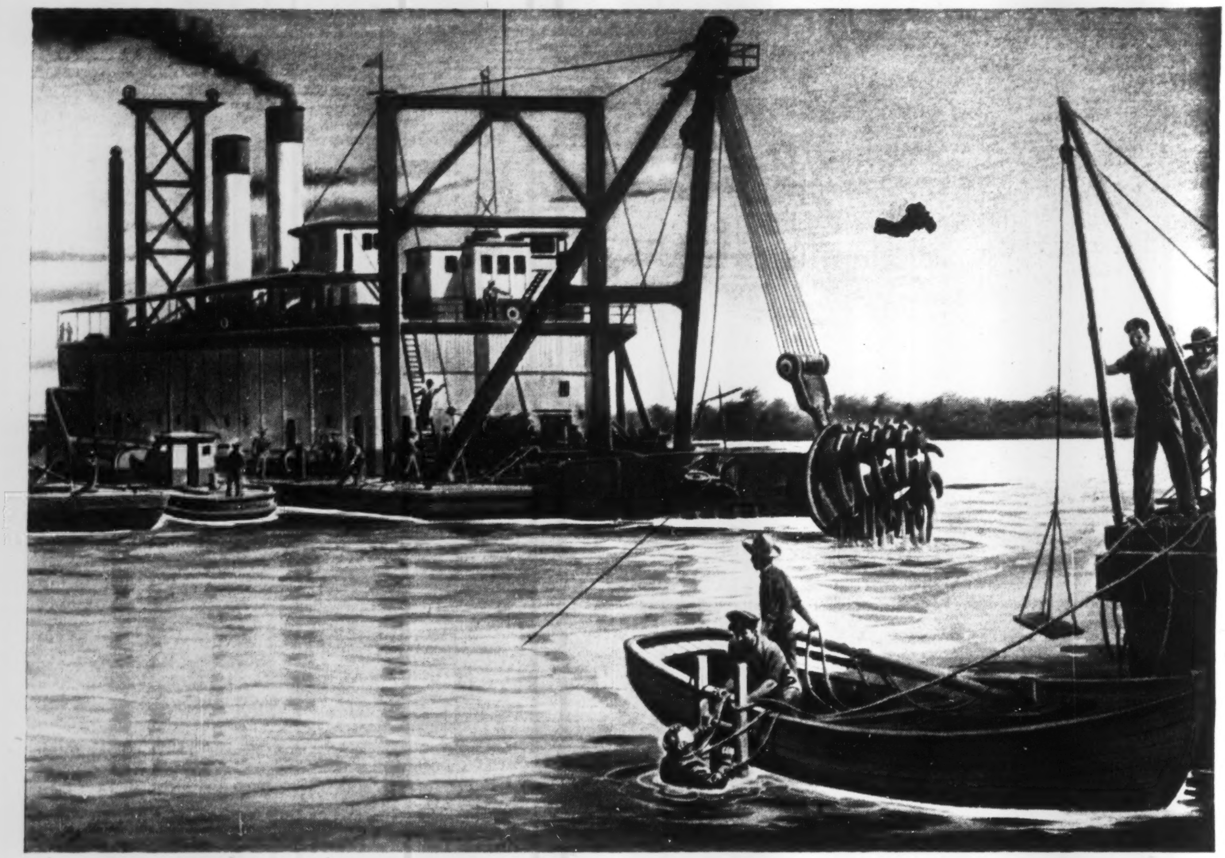
•[a] 8-hr day •[b] Minimum rate Contractors actually pay more •[c] Rate for good carpenters •[d] Maximum rate

Construction materials prices, f.o.b. city

City	Structural steel per cwt 6/53	6/52	Reinf. steel per cwt 6/53	6/52	Portland cement per bbl bulk		Lumber 2x4 s4s per Mftbm 1st cl pine 6/53	6/52	2nd cl pine 6/53	6/53
Anchorage, Alaska	$4.85[a]	$4.30[a]	$6.05[a]	$5.55[a]	$7.95[b]	$7.75[b]	$135[c]	$135[c]	$135[c]	$135[c]
Honolulu, Hawaii	5.30[d]	4.90[d]	5.10[d]	4.70[d]	4.43	4.23	145[e]	142[e]	135[e]	132[e]
San Juan, P. R.	240.00[f]	240.00[f]	7.25	8.50[A]	1.05[g]	4.20	150	140	120	120[B]

•[a] fob dock, Seattle •[b] Price in paper bags, fob dock Seattle, Jun '53 was $4.36/bbl; Jun '52, $3.85/bbl •[c] Douglas fir delivered. Spruce 2x4's Jun '53, $125/mftbm; Jun '52 $125/mftbm •[d] Honolulu base price •[e] Douglas fir •[f] per ton, 2000 lb •[g] per cwt Ranges: [A] $7.50-8.50 [B] $110-120

(For prices and wages in other countries see ENR July 30, 1953, pages 33, 56, 75, 85, 99)



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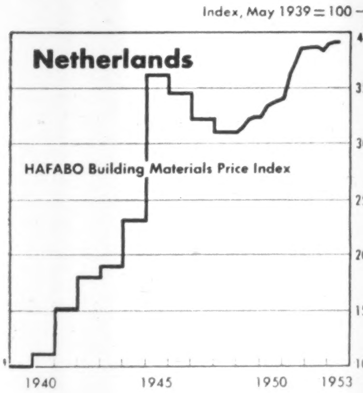
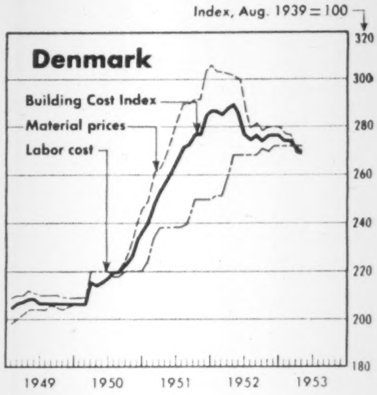
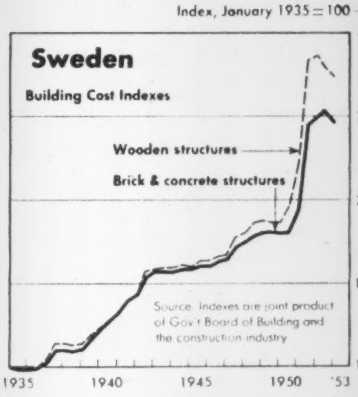
TWENTY-FOUR AMERICAN CAPITAL STOCK FIRE, MARINE AND CASUALTY INSURANCE COMPANIES PROVIDING INSURANCE PROTECTION IN FOREIGN LANDS







Source: Indexes are joint product of Gov't Board of Building and the construction industry

Cost trends around the world

Continued from preceding page

apartments per floor. Items and their weight are bricklayers & masons 16%; carpenters 9%; interest on financing 11%; cement 6%; iron 4%; wall paint 5%; framing, doors & windows 6%; bathroom, complete, 6%; other materials, & gas stove, 17%; architect-engineer fees & other expenses 20%.

Buenos Aires, Argentina—This construction cost index is described in the November 1, 1951 ENR on page 125.

Netherlands—The HAFABO building materials price index measures the trend in the cost of materials used to construct a 2-story house.

Copenhagen, Denmark—Monthly indexes measuring trends in building costs, materials prices and wage rates are compiled by the Ministry of the Interior (Housing Dept.), the State Statistics Dept., and other agencies.

Sweden—Indexes include general construction costs and the cost of installing heating, ventilation, plumbing and electrical equipment.

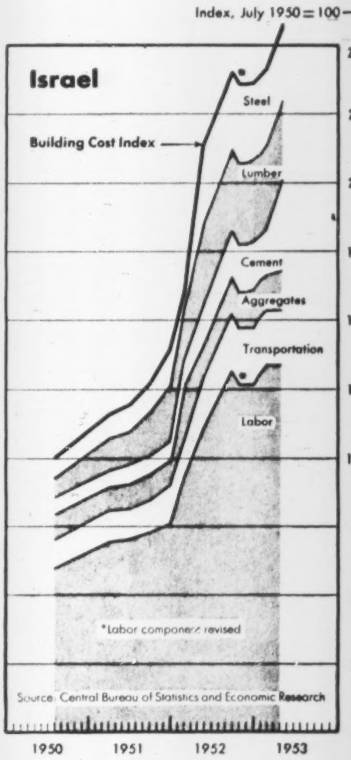
Belgium—The wholesale price index of building materials published by the Institute of Economic and Social Research of the Catholic University of Louvain includes: portland cement; lumber; quarry products; brick and ceramic products; and glass.

The wage index, compiled by the National Bank of Belgium, is the average for skilled and unskilled construction workers. It includes a special bonus addition in December 1950 and an increment paid by the government for the six months ended March 1952. Wage rates vary with the official retail price index which caused the wage index to dip in December 1952.

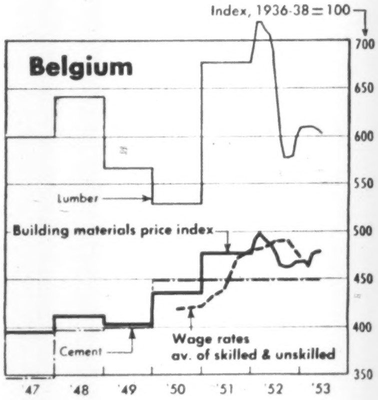
Austria—The building cost index computed by Engr. Dr. Techn. Rudolph Maculan, contractor-engineer, includes materials and labor costs, in addition to transportation charges, labor insurance, and contractor's planning.

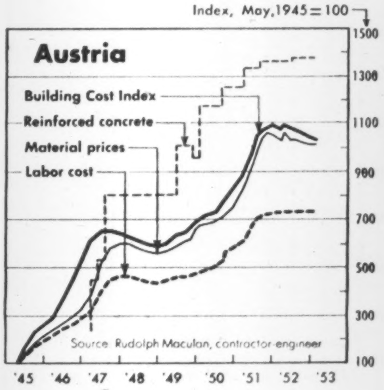
Italy—The wage index shown in the chart includes the worker's family allowance based on a wife and three children. The index is published on 1938 = 100 base, but has been converted to a 1949 = 100 base. accompanying chart.

Israel—The labor component of the index was revised in October 1952 to include 9.7 man days of semi-skilled labor plus the labor cost for 22.5 sq meters of building block; 45.9 sq meters of plastering; 14.9 sq meters of paving; and 21 sq meters of roof trusses. The prices of lumber and steel are for imported material. Wage rates are tied to the cost of living index. This explains the increase in the labor component during 1952.

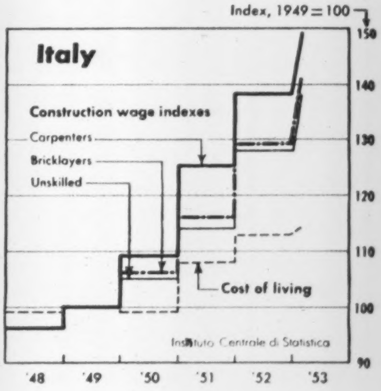


Source: Central Bureau of Statistics and Economic Research



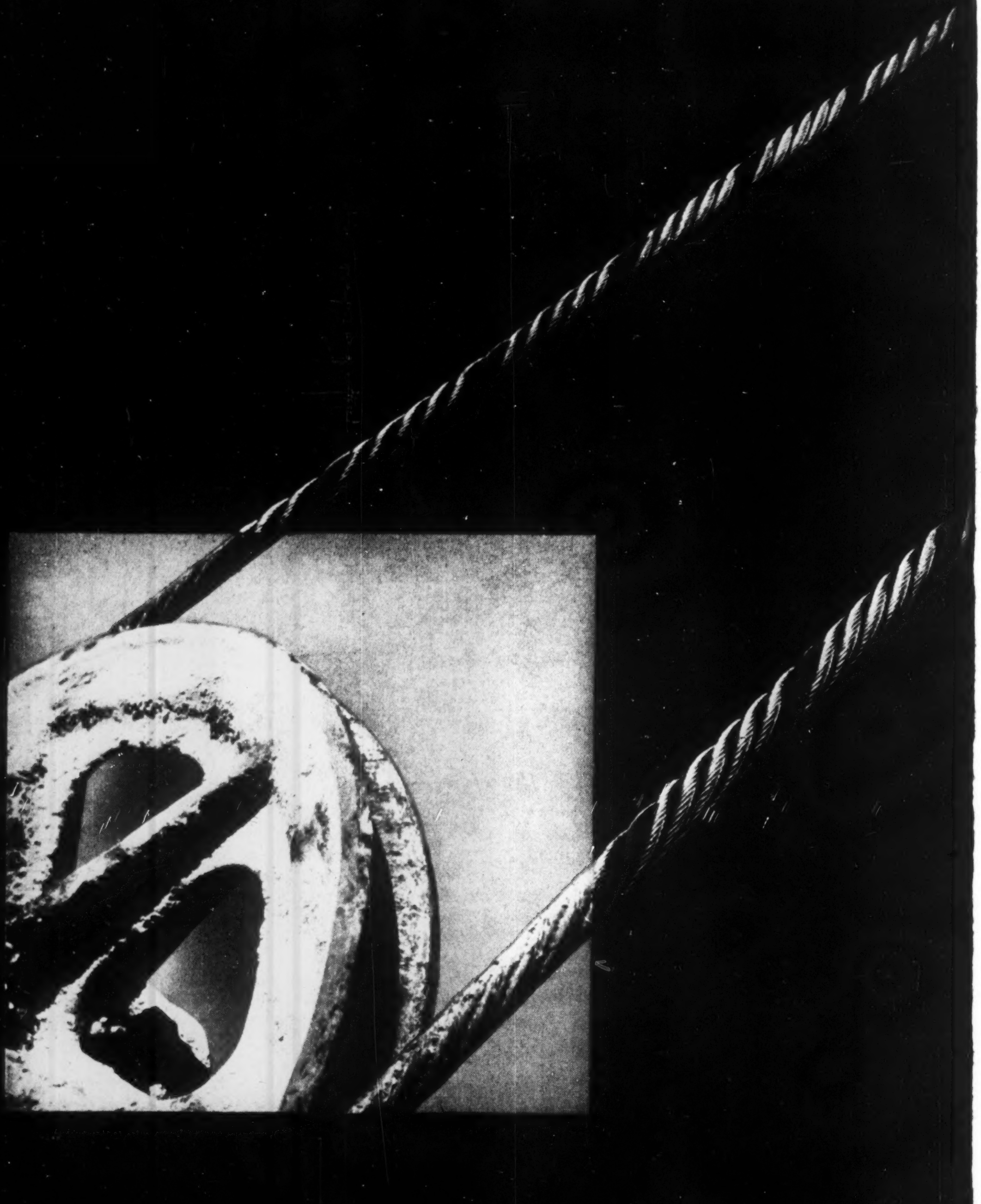


Source: Rudolph Maculan, contractor-engineer



Instituto Centrale di Statistica

Why should you consider using



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Why indeed. Aren't all wire ropes alike? They look alike. Why should you choose HERCULES Red-Strand rather than any other?

The answer would be easy if you could discover by *feel* why HERCULES Red-Strand performs so well. Or if you could see, or hear, or taste the *special quality* that makes users praise it so highly. But you can't. Wire rope isn't like that.

The big reason is performance

Usually you become aware of the consistently high performance of HERCULES Red-Strand by hearing users praise it . . . or by using it yourself and checking results.

Then you realize there must be *something special* about this rope. And you are right. *There is.*

What is this something special?

It is partly the result of generations of specialization. Leschen is concerned *entirely* with making wire rope. Nothing else. No other processes or activities interfere.

It is partly Leschen's 97 years' experience and Leschen's natural ability to make good wire rope . . . which has resulted in several major "firsts" in the development and most efficient use of wire rope.

It is partly pride of craftsmanship . . . from policy to engineering to finished rope. It is the effort always to make HERCULES Red-Strand *better than we claim it to be.*

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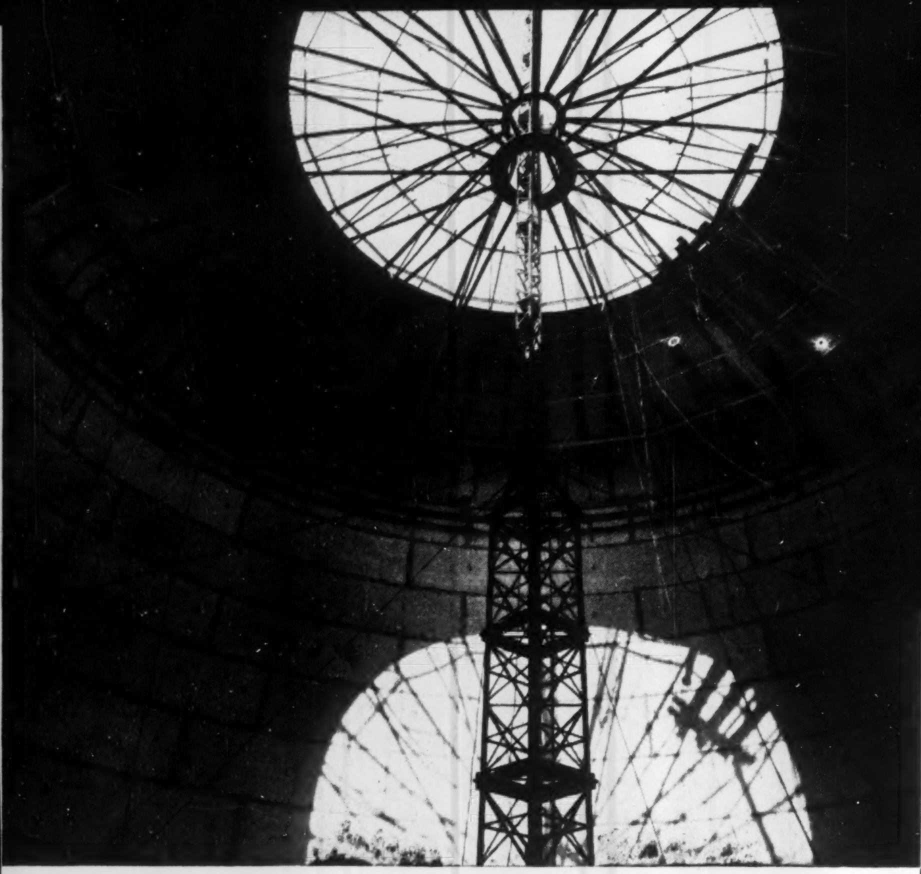
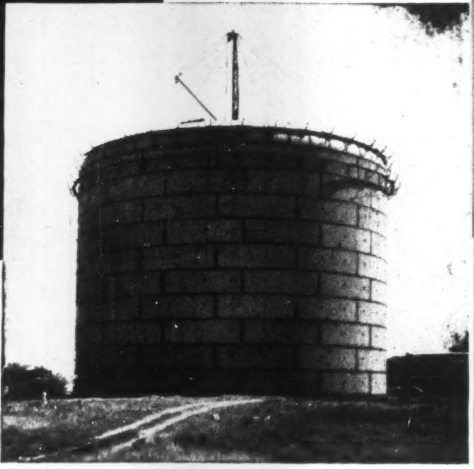


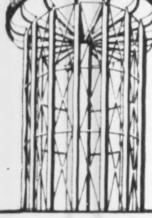
Interior view—7,200,000-gallon steel reservoir under construction in the Pittsburgh district, showing roof framework before center course of roof plates was completed.

Exterior of the South Pittsburgh Water Co. reservoir, during construction. Unit is 116 feet in diameter, with 95 feet head range.



Pittsburgh • Des Moines

Steel Construction FOR WATER STORAGE



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2,500,000-gallon radial cone elevated steel tank under erection for South Pittsburgh Water Co., showing tubular columns, riser and several radial girders in place. Tank is 112 feet in diameter; head range 35 feet; height to high water line 165 feet.

Construction materials prices in 20 cities

Market quotations on construction materials as reported to Engineering News-Record

ENR 20-Cities	CEMENT, Bulk per bbl CL lots, fob city Incl Dealer Comn. 1952 Low	CEMENT 1952 High-Dec.	SAND, per ton Truck lots or over fob city 1952 Low	SAND 1952 High-Dec.	CONCRETE, READY-MIXED 1:2:4 over 50 cy per cy delivered 1952 Low	CONCRETE 1952 High-Dec.	BRICK, CLAY BACKING per M quantity delivered 1952 Low	BRICK 1952 High-Dec.	STRUCTURAL CLAY TILE Partition, Scored, 3 x 12 x 12 per 2000 pieces or over delivered 1952 Low	TILE 1952 High-Dec.
Average	**3.17**	**3.22**	**2.10**	**2.11**	**10.89**	**11.37**	**30.86**	**31.85**	**155.74**	**156.85**
Atlanta	3.45	3.50	1.75	1.75	11.50	11.99	27.38	27.78	195.00	195.00
Baltimore	3.40	3.45	2.00[e]	2.00[e]	10.80	10.80	36.00	37.00[e]	183.00	183.00
Birmingham	2.68	2.81	1.94	1.94	7.85	9.85	23.50	23.50	118.00[c]	118.00[c]
Boston	3.69	3.69	2.50	2.50	11.50[i]	11.50[i]	33.50[c]	34.50[c]	196.00[s]	196.00[s]
Chicago	2.99	3.02	3.40[e,f]	3.40[e,f]	11.50	12.00[j]	21.00	23.00	135.00	135.00
Cincinnati	3.23	3.40	2.05[e,g]	2.14[e,g]	10.95	11.45	34.00[c]	34.50[c]	185.00[c]	185.00[c]
Cleveland	2.90	3.01	1.65	1.65	13.00[k]	13.50[k]	32.00	32.00	149.00	172.00
Dallas	2.65	2.65	1.84	1.84	9.30	9.30	19.75	19.75	......	......
Denver	3.59	3.64[d]	1.20	1.20	10.10	10.50	34.00	34.00	......	......
Detroit	2.98	3.00	3.75[e,f]	3.75[e,f]	10.30	10.75	34.00[c]	34.90[c]	127.75	127.75
Kansas City	3.03	3.03	1.50[e]	1.50[e]	10.95[l]	11.60[l]	26.00	26.00	115.50	115.50
Los Angeles	3.52[a]	3.60[a]	1.95	1.95	10.43[m]	10.43[m]	21.00[t]	24.50[t]	......	......
Minneapolis	3.42[b]	3.49[b]	1.35[e]	1.35[e]	11.25	12.15	32.00[c]	32.00[c]	171.50[c]	171.50[c]
New Orleans	2.90	3.02	1.82	1.82	12.90	12.90	31.00	31.00	170.00	170.00
New York	3.50	3.55	1.60[f,h]	1.60[f,h]	11.30[n]	11.80[n]	35.00	38.50[e]	138.70[x]	138.70[x]
Philadelphia	3.22	3.30	2.15[e]	2.15[e]	11.50	11.50	29.00	32.00	126.30	126.30
Pittsburgh	3.04	3.04	2.10[c]	2.10[e]	11.00	12.50	32.00	36.00	112.00	112.00
St. Louis	3.03[e]	3.03[e]	2.50[e]	2.50[e]	10.40	10.75	40.00	40.00	138.00[x]	139.00[x]
San Francisco	2.95	2.96	1.98	2.02	10.30[o]	10.70[o]	37.00	37.00	156.85[y,z]	156.85[y,z]
Seattle	3.25[a]	3.25[a]	3.00[s,f]	3.00[s,f]	10.95	11.40	39.00	39.00	175.00[x]	175.00[x]
Montreal	2.51[a]	2.86[a]	1.90	2.25	9.65	10.40[p]	26.50	31.00	150.00	150.00

[a] subj to 10¢ disc [b] CL price, dealers sell only LCL [c] less 2% for cash [d] Dec. $3.59 [e] delivered [f] per cy [g] 5 tons or more [h] barge lots asd [i] 50¢ cash disc [j] Dec. $11.94 [k] 7-9 mi zone [l] 25 cy plus [m] 1:2½:4 mix [n] 5 cy or more deliv Man [o] 10–100 cy [p] Dec. $9.65 [q] Dec. $27.38 [r] Dec. $36.00 [s] truck loads [t] fob yard [u] Dec. $35.00 [w] fob trucks, job site [x] truck deliv [y] smooth [z] fob Stockton

LUMBER, No. 2 Common or better, 2 x 4 s4s

ENR 20-Cities	Short Leaf Yellow Pine 1952 Jan.-Low	High	Dec.	1953 Jan.	Apr.	Douglas Fir 1952 Jan.-Low	High	Dec.	1953 Jan.	Apr.
Average	**91.43[j]**	**93.43**	**93.03**	**93.20**	**93.20**	**105.65**	**110.32**	**107.72**	**107.10**	**107.63**
Atlanta[a]	67.00	69.00	69.00	69.00	73.50	......	......	......	......	......
Baltimore[b]	75.00[k]	85.00	75.00	77.50	78.00	100.00	110.50	101.00	102.00	100.00
Birmingham[a]	70.00	70.50	70.50	70.50	70.50	75.00	80.50	80.50	80.50	80.50
Boston[b]	95.00[i]	104.00[i]	104.00[i]	98.00[i]	98.00[i]	105.00[e]	112.00[e]	103.00[e]	103.00[e]	103.00[e]
Chicago[d]	92.00	92.00	92.00	92.00	92.00	100.00	104.50	104.50	104.50	103.50
Cincinnati[b]	84.00	88.00	88.00	88.00	88.00	111.00	118.00	111.50	111.50	117.00
Cleveland[d]	80.00	90.00	86.00	86.00	87.00	95.00	110.00	102.00	99.00	101.00
Dallas[a]	69.00	69.00	69.00	69.00	69.00	......	......	......	......	......
Denver[b]	......	......	......	......	......	125.00[h]	137.00[h]	137.00[h]	137.00[h]	128.00[h]
Detroit[e]	100.00	102.00	101.00	101.00	101.00	105.50[e]	111.50	105.50	110.50	105.50
Kansas City[b]	120.00	122.00	122.00	122.00	122.00	120.00	122.00	122.00	122.00	122.00
Los Angeles[f]	......	......	......	......	......	92.00[f,p]	102.00[f]	96.00[f]	96.00[f]	96.00[f]
Minneapolis[g]	......	......	......	......	......	135.00[e]	135.00[e]	135.00[e]	135.00[e]	135.00[e]
New Orleans[a]	92.00	92.50	92.50	92.50	92.50	103.25	105.25	103.25	95.00	112.00
New York[h]	102.50	112.50	112.50	112.50	112.50	117.50	122.50	117.50	117.50	117.50
Philadelphia[f]	120.50[l]	122.00	120.50	120.50	120.50	135.00	137.50	137.50	137.50	137.50
Pittsburgh[a]	92.50	92.50	92.50	92.50	92.50	105.00	115.00	115.00	115.00	115.00
St. Louis[g]	99.00[m]	108.00	101.00	107.00	101.00	116.75	128.75	118.75	111.75	113.75
San Francisco[a]	......	......	......	......	......	69.00[a,r]	81.50[a]	69.00[a]	70.00[a]	70.00[a]
Seattle[a]	......	......	......	......	......	77.50[a]	80.00[a]	80.00[a]	80.00[a]	80.00[a]
Montreal	85.00[i,n]	95.00[i]	85.00[i]	85.00[i]	85.00[i]	175.00	175.00	175.00	175.00	175.00

[a] fob mill [b] fob city CL out of yard [c] asd [d] fob city CL direct mill [e] deliv to contr [f] retail LCL at yard [g] retail LCL deliv [h] deliv truck lots [i] spruce [j] Jan $91.67 [k] Jan $85 [l] Jan $122 [m] Jan $104 [n] Jan $95 [o] Jan $105.75 [p] Jan $97 [r] Jan $78

Building materials prices

ENR average yearly prices at New York, except steel

Year	Brick common per M	Cement per bbl	Lime per bbl	Pine per M ft bm	Steel shapes per cwt h
1874	$7.41	$1.48R	$1.50a	$26.00d	
1890	6.65	2.25R	.96a	21.75d	....
1907	6.16	1.55C	.95a	30.50d	1.75
1913	6.75	1.18C	.915a	25.04e	1.50
1929	11.71	2.23C	2.25b	64.50f	1.92
1932	9.75	1.62C	2.25b	39.91f	1.56
1938	13.10	2.12C	2.80b	59.33f	2.18
1939	13.46	2.20C	2.80b	64.35f	2.10
1942	14.17	2.20C	2.80b	85.61f	2.10
1947	26.38	3.46C	24.34c	115.83g	2.61
1948	30.33	4.05p	26.32c	114.38g	2.98
1949	33.00	3.32p	26.80c	98.13g	3.25
1950	33.50	3.52p	27.10c	131.88g	3.42
1951	37.92	3.78p	31.00c	154.79g	3.65
1952	36.45	3.84p	32.00c	155.00g	3.73

•**BRICK:** wholesale, fob; •**CEMENT:** net, delivered **R** Rosendale, rest Portland **C** in cloth bags delivered (1949-$4.23) **p** in paper bags, fob city in carload lots; •**LIME:** **a** common lump, wholesale, fob, 180 lb., net, **b** 280 lb., **c** common hydrated, delivered, per ton (40 bags of 50 lb. ea) no longer quoted per bbl.; •**LUMBER:** No. 1 common, rough, **d** 1-in. yellow pine, wholesale at dock, **e** 3-in. LLYP, **f** 3x12 LLYP from Lumber Trade Jl., **g** 3x12 SLYP (LLYP out of market); •**STEEL:** h fob Pittsburgh.

Wholesale price index, building materials

Bureau of Labor Statistics, 1947-49 = 100

Month	1947‡	1948‡	1949‡	1950‡	1951‡	1952	1953
Year	94.0	104.0	102.0	109.5	119.6	118.2	.....
Jan	88.7	100.7	105.4	102.1	120.2	117.8	118.4
Feb	89.9	101.2	104.9	103.2	120.7	117.9	118.7
Mar	91.5	101.8	104.4	104.1	120.8	118.0	119.2
Apr	92.8	102.0	103.4	104.7	120.9	118.2	119.9
May	93.0	102.5	102.4	106.3	120.7	118.1	120.2
June	92.8	103.1	101.5	107.5	120.0	117.8	120.5
July	93.4	104.5	100.3	109.1	119.4	118.0	121.3p
Aug	94.9	106.7	99.7	112.0	118.9	118.6	.....
Sept	96.2	107.0	99.9	114.4	118.7	118.7	.....
Oct	97.1	106.6	100.2	115.8	118.7	118.6	.....
Nov	98.3	106.3	100.6	116.3	118.5	118.4	.....
Dec	99.2	105.9	101.2	118.3	118.0	118.3	.....

Official beginning January, 1952 ‡ Unofficial—for official index for these years see the 1926=100 wholesale price index discontinued by BLS 1952 p preliminary

The building materials wholesale price index for August 1953, 120.8, is more than 10 points higher than the all-commodities price index of 110.6. But it is almost 9 points below the metals and metal products price index of 129.3. Farm products prices this year at 96.3 are the lowest of all groups.

All indexes are computed on a base period of 1947-49 = 100.

Major items included in BLS building materials price index—1947–49=100

Major items	Weight %	August 15 1947	1948	1949	1950	1951	1952	1953
All building materials	**100.0**	94.9	106.7	99.7	112.0	118.9	118.6	120.8
Lumber & wood products	**38.6**	....	.....	.....	.....	.....	.....	.....
Douglas fir	8.2	99.2	113.8	92.0	133.0	126.2	128.3	115.5
Southern pine	9.3	95.2	105.9	92.1	114.3	114.7	117.0	115.0
Other softwoods	7.1	91.0	111.7	103.2	124.6	128.2	129.7	134.8
Hardwood	6.3	96.0	108.7	90.8	117.3	119.6	110.9	115.8
Millwork	5.9	87.6	108.1	107.2	113.0	130.4	127.2	131.7
Softwood plywood	1.3	88.3	119.7	90.6	116.7	124.5	112.9	115.4
Hardwood plywood	0.5	96.1	105.8	92.9	106.1	111.6	101.1	110.9
Non-metal minerals	**19.2**	....	.....	.....	.....	.....	.....	.....
Concrete ingredients	6.3	94.0	103.3	105.0	106.2	112.9	112.9	118.6
Portland cement	3.0	92.6	104.8	105.2	107.1	116.4	116.4	123.8[J]
Concrete products	3.1	95.5	102.2	103.9	105.1	112.4	112.4	116.1
Prep. asph. roofing	3.1	94.4	103.6	102.6	100.5	105.4	106.0	105.8
Struct. clay products	2.5	93.9	104.2	105.2	112.3	121.4	121.3	131.3
Gypsum products	1.2	92.5	104.1	102.3	104.7	117.4	117.7	122.1
Other	3.0	not available						
Insulation matl.	na	97.4	103.5	99.1	102.3	104.1	105.1	107.8

Major items	Weight %	August 15 1947	1948	1949	1950	1951	1952	1953
Metals & Metal products	**29.5**	....	.....	.....	.....	.....	.....	.....
Structural shapes	1.4	89.9	112.4	112.4	120.4	128.4	134.9	141.9
Metal doors, sash trim	3.3	97.2	102.8	102.8	107.3	117.7	117.7	127.3
Heating equipment	9.5	95.0	102.7	102.5	105.4	114.5	113.7	115.4
Plumbing equipment	3.4	94.8	104.9	102.2	109.5	122.4	118.1	118.7
Other	11.9	not available						
Hardware (finished)	**na**	97.9	105.1	101.9	112.8	127.7	122.3	133.4
Paint & paint materials	**6.8**	97.0	100.9	96.5	96.9	107.4	106.9	106.3
Prepaid paints	6.5	98.7	100.6	98.9	99.5	109.1	110.6	110.7
Paint materials	0.3	93.3	101.7	93.1	90.8	103.4	98.1	96.0
Machinery & Motive prod.	**2.9**	....	.....	.....	.....	.....	.....	.....
Elevators, escalators	0.8	95.6	100.0	105.2	104.9	113.3	114.1	116.2
Fans, blowers	0.4	88.7	104.5	113.7	122.1	141.8	136.7	141.9
Iridescent lamps	1.7	95.9	104.6	104.6	104.6	121.9	117.9	136.9[J]
Bldg. paper & board	**1.6**	91.8	105.5	103.8	108.6	113.4	115.8	123.0
Miscellaneous	**1.4**	not available						

[J] July 15

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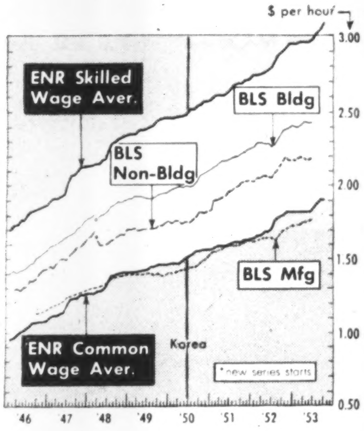


Wages rise nearly 6% in '53

Construction workers came up with another round of large wage increases in '53. The net gain for common labor, including fringe benefits, was 6%, for skilled trades, 5.6%, 10% for common labor and 7.4% for skilled labor.

The '53 pattern of wage boosts held close to 10-15 cents per hour range forecast by Engineering News-Record at the beginning of the year.

Common labor unions won increases in 19 of the 20 cities covered by ENR for an average increase of 11 cents per hour. This compares with a record 16.6-cent hourly boost which they bargained for in '52.

Among the three key skilled trades, structural ironworkers gained most with an average 18.8-cent increase, higher even than the average 17.3-cents they won in '52. Carpenters came up with 15.3-cents this year as against a 19.2-cent boost in '52. Bricklayers, who top the wage scale, settled for an average of 10.1 cents per hour more in '53, a big drop from the 18.7-cent boost in '52.

These rates include fringe benefits which continued to play a big part in union wage demands this year, either in demands for new benefits or for additions to existing plans.

Construction wages—ENR 20-cities averages

SKILLED LABOR, dollars per hour
(Bricklayer, carpenter, ironworker average)

	1926	1932	1939	1945	1946	1949	1950	1951	1952	1953
J	1.24	1.15	1.43	1.64	1.70	2.35	2.46	2.604	2.760	2.942
F	1.24	1.11	1.43	1.64	1.73	2.35	2.47	2.615	2.760	2.946
M	1.24	1.11	1.43	1.64	1.74	2.38	2.47	2.619	2.773	2.949
A	1.25	.95	1.44	1.65	1.76	2.38	2.48	2.619	2.776	2.950
M	1.26	.96	1.44	1.65	1.77	2.38	2.48	2.629	2.796	2.955
J	1.27	.99	1.44	1.66	1.80	2.39	2.52	2.648	2.808	2.976
J	1.27	1.00	1.44	1.66	1.82	2.41	2.52	2.688	2.849	3.021
A	1.28	.98	1.44	1.67	1.83	2.44	2.54	2.701	2.885	3.062
S	1.28	.99	1.44	1.67	1.84	2.45	2.55	2.701	2.909	3.075
O	1.29	.98	1.44	1.67	1.85	2.46	2.56	2.719	2.921	....
N	1.29	.97	1.46	1.68	1.86	2.46	2.57	2.728	2.937	....
D	1.29	.98	1.46	1.68	1.87	2.46	2.58	2.752	2.937	....
Av	**1.27**	**1.02**	**1.44**	**1.66**	**1.80**	**2.41**	**2.52**	**2.668**	**2.841**	....

COMMON LABOR, dollars per hour
(Building and heavy construction average)

	1926	1932	1939	1945	1946	1949	1950	1951	1952	1953
J	.54	.452	.682	.891	.952	1.417	1.485	1.585	1.654	1.817
F	.54	.452	.680	.891	.968	1.417	1.485	1.593	1.659	1.817
M	.543	.436	.680	.895	.988	1.424	1.486	1.595	1.664	1.821
A	.543	.412	.683	.904	1.004	1.428	1.493	1.595	1.680	1.824
M	.55	.411	.682	.909	1.018	1.431	1.511	1.608	1.690	1.824
J	.55	.412	.684	.916	1.034	1.441	1.528	1.615	1.706	1.852
J	.553	.411	.684	.916	1.058	1.465	1.538	1.629	1.755	1.877
A	.555	.422	.685	.916	1.071	1.470	1.561	1.637	1.793	1.921
S	.555	.431	.685	.917	1.072	1.478	1.561	1.637	1.803	1.921
O	.55	.431	.685	.917	1.073	1.478	1.568	1.645	1.817	....
N	.555	.426	.685	.917	1.078	1.478	1.574	1.646	1.817	....
D	.555	.427	.685	.938	1.085	1.478	1.574	1.651	1.817	....
Av	**.548**	**.4269**	**.683**	**.910**	**1.033**	**1.450**	**1.530**	**1.620**	**1.738**	....

Averages include fringe benefits—see 1952 wage table by trades for each of 20 cities for nature and extent of these—welfare fund, pension fund and others.

Skilled and common wage rates in 20 cities

	Hrs per	Bricklayers 1952			Carpenters 1952			Structural Ironworkers 1952			Common labor (Av bldg & heavy constr) 1952		
ENR 20-Cities	**day**	**Low**	**Aver**	**High**	**Low**	**Aver**	**High**	**Low**	**Aver**	**High**	**Low**	**Aver**	**High**
Atlanta	8	$2.75	$2.787	$2.90	$2.20	$2.225	$2.35	$2.335	$2.455	$2.60	$1.05	$1.07	$1.13
Baltimore	8	3.20[a]	3.20[a]	3.20[a]	2.58	2.58	2.58	2.90	3.025	3.125[l]	1.49	1.527	1.565[l]
Birmingham	8	2.75	2.833	3.00	2.125	2.192	2.24	2.42	2.486	2.50	1.15	1.212	1.275
Boston	8	2.888	3.002	3.06[b]	2.475	2.575	2.625	2.75	2.796	2.82	1.815	1.922	1.99[b]
Chicago	8	3.25[c]	3.25[c]	3.25[c]	2.70[j]	2.837[j]	3.00[j]	2.80[j]	2.887[j]	3.05[j]	2.05	2.125	2.20[j]
Cincinnati	8	2.90	2.991	3.12	2.475	2.55	2.625	2.665	2.727	2.815	1.65	1.762	1.92
Cleveland	8	3.00	3.05	3.12	2.825	2.974	3.075	2.825	2.974	3.075	2.10	2.271	2.35
Dallas	8	3.437	3.437	3.437	2.337	2.396	2.48	2.50	2.552	2.625	1.275	1.301	1.337
Denver	8	3.00	3.15	3.45	2.35	2.419	2.625	2.35	2.434	2.50	1.575	1.612	1.725
Detroit	8	3.00	3.069	3.18[j]	2.75[j]	2.819[j]	2.93[j]	2.95[j]	3.052[j]	3.18[j]	1.90	2.060	2.18[j]
Kansas City	8	2.86	3.393	3.50	2.365	2.457	2.55	2.53	2.605	2.68	1.73	1.895	1.88
Los Angeles	8	3.00	3.073	3.175	2.35	2.441	2.57	2.50	2.65	2.70	1.75	1.829	1.94
Minneapolis	8	2.90	2.95	3.05	2.40	2.45	2.55	2.57	2.595	2.72	1.67	1.72	1.82
New Orleans	8	2.70	2.775	2.85	2.06	2.14	2.22	2.45	2.541	2.65	1.10	1.162	1.225
New York	7	3.548[d]	3.674[d]	3.85[d]	3.09[i]	3.152[i]	3.24[i]	2.348[i]	3.411[i]	3.50[i]	1.90	1.962	2.05
Philadelphia	8	3.46[e]	3.485	3.61[f]	2.65	2.795	2.90	3.14	3.245	3.32[k]	1.66	1.816	1.90
Pittsburgh	8	3.25	3.275	3.40	2.75	2.791	3.00	2.75	2.771	2.875	1.70	1.808	1.90
St. Louis	8	3.09[g]	3.396[g]	3.55[g]	2.70	2.818	2.90	2.75	2.825	2.90	1.77	1.88	1.97
San Francisco	8	3.25[h]	3.25[h]	3.25[h]	2.45	2.551	2.705	2.70	2.766	2.85	1.70	1.787	1.85
Seattle	8	3.30	3.30	3.30	2.51	2.545	2.58	2.71	2.745	2.78	2.055	2.125	2.16
Montreal	8	1.75	1.837	1.90	1.55	1.887	1.70	1.65	1.737	1.80	1.15	1.179	1.20

[a] Incl 10¢ welfare fund, Baltimore [b] Incl 6¢ welfare fund, Boston [c] Incl 7.5¢ welfare fund, Chicago [d] Incl 3% welfare plus 20¢ pension fund, New York [e] Incl 3½% welfare fund, Philadelphia [f] Incl 15¢ pension fund, Philadelphia [g] Incl 3% vacation stamp fund, St. Louis [h] 7-hr day, San Francisco [i] Incl 3% welfare fund plus 6 paid holidays, New York [j] Incl 5¢ welfare fund, Chicago and Detroit [k] Incl 9¢ welfare fund, Philadelphia [l] Inc. 7½¢ health and welfare fund, Baltimore

Equipment operator wage rates—as reported to Engineering News-Record

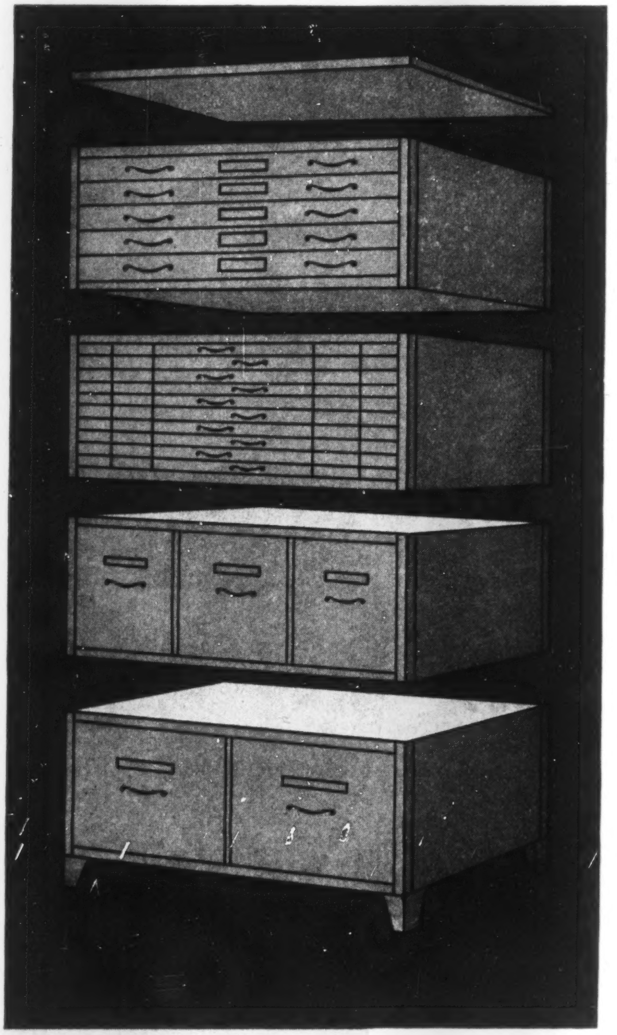
Sept 1953	Truck drivers	Dump		Tractor operators incl bulldozers			Tractor scraper	Power cranes & shovels		Motor grader oper	Air comp oper	Air tool oper
ENR 20-Cities	**1½ T**	**−4 cy**	**+4 cy**	**34-49 hp**	**70-100 hp**	**100 & over**	**15-16 cy**	**½ cy**	**¾ cy**			
Atlanta	1.35	1.60	1.60	2.245	2.295	2.325	2.225	2.90	2.90	2.225	1.90	1.50
Baltimore	1.65[a]	1.80[a]	1.90[a]	2.25	2.25	2.25	2.25	3.10[b]	3.10[b]	2.25	3.10[b]	2.25
Birmingham	1.37	1.65	1.92	2.385	2.385	2.385	2.525	2.525	2.525	2.385	2.11	1.45
Boston	1.84[e]	....	....	2.625[d]	2.625[d]	2.625[d]	2.625[d]	3.00	3.00	2.825	2.555	2.18[e]
Chicago	1.75[f]	....	....	2.70[g]	2.85[h]	2.75[i]	2.52	3.15	3.15	2.825	2.65	....
Cincinnati	1.895	1.90[j]	1.90[j]	2.70[k]	2.70[k]	2.70[k]	2.70[k]	2.95[k]	2.95[k]	2.70[k]	2.95[k]	2.95[k]
Cleveland	2.25	2.25	2.25	2.95	2.95	2.95	2.95	3.20	3.20	2.95	2.825[l]	2.825
Dallas	1.40	1.40	1.40	1.40/2.625[m]	1.50/2.625[m]	1.50/2.625[m]	1.50/2.625[m]	1.50/2.625[m]	1.60/2.625[m]	1.50/2.625[m]	1.40/2.00[m]	1.55
Denver	1.925	1.925	2.025	1.925	2.535	2.535	2.535	2.705	2.705	2.535	2.535	....
Detroit	2.20[a]	2.20[a]	2.20[a]	3.08[n]	3.08[n]	3.08[n]	3.08[n]	3.08[n]	3.08[n]	3.08[n]	2.805[n]	2.805[n]
Kansas City	1.94[c]	2.015[p]	2.015	2.04	2.675[r]	2.675[r]	2.675[x]	2.875	2.875	2.45[t]	2.525[u]	2.45
Los Angeles	2.13	2.13	2.16	2.65	2.65	2.65	3.06	2.88	2.88	2.79	2.35	2.26
Minneapolis	1.92	1.92[v]	2.07[w]	2.28	2.50[r]	2.72[x]	2.50	2.72[y]	2.98[z]	2.28	2.17	2.05
New Orleans	1.475	1.475	1.475	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.05	1.475
New York	1.92¼[aa]	2.40	2.40	2.925	2.925	2.925	3.05	3.80	3.80	3.05	3.05[u]	2.55
Philadelphia	1.875	1.875	1.875	2.875[dd]/2.89[ee]	2.875[dd]/2.89[ee]	2.875[dd]/2.89[ee]	3.125[dd]/3.14[ee]	3.39[dd]/3.50[ee]	3.39[dd]/3.50[ee]	3.09[dd]/3.10[ee]	2.69[dd]/2.775	1.875
Pittsburgh	2.025	2.025	2.025	2.85	2.85	2.85	2.85	3.125	3.125	2.95	2.85	2.125
St. Louis	2.025	2.025	2.025	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.40	1.97
San Francisco	2.02	2.02	....	2.77	2.77	2.77	2.77	3.10	3.10	2.93	2.38	2.10
Seattle	2.26[o]	2.26[bb]	2.46[cc]	2.46	2.66	2.66	2.66	3.01	3.01	2.71	2.46	2.28
Montreal	1.00	1.15	1.15	1.53	1.53	1.53	1.53	1.79	1.79	1.53	1.40	1.40

[a] incl 5¢/hr H&WF [b] straight time, broken $3.25 [c] 2-axle 3-axle $1.90, Euclid $2.10 [d] intermediate [e] bldg constr, highway $2.075 [f] less than 2-t [g] blade [h] scoop bldg [i] scoop, road [j] plus $2 pd by employer for hosp death benefits to family [k] plus 5¢ Oct 1 [l] bldg constr, steel constr $3.20 [m] higher rates are union, other taken from min wage scale approved by County Commissioners Court [n] incl 8¢/hr H&WF [o] flat bed [p] excavating [r] over 50 hp [s] blade grader [t] form and subgrade [u] single [v] up to 6 cy [w] 6-8 cy [x] cat oper [y] up to 3½ cy [z] 3½ cy & over [aa] applies to local 807 [bb] up to 5 cy [cc] 5 cy & over [dd] bldg & hvy const [ee] hvy cons

KEEP THOUSANDS OF TRACINGS SAFE

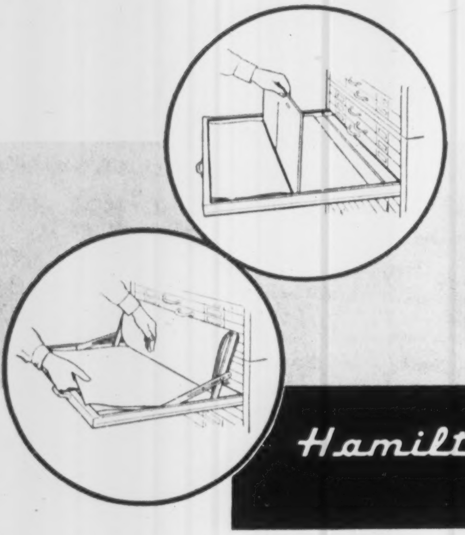
...find any *one* instantly!

in Hamilton's steel sectional UnitSystem



Hamilton's filing units provide *maximum capacity with absolute protection!* The 10-drawer Shallow Drawer Unit alone holds 1,000 drawings — kept flat, safe, readily accessible by exclusive *Tracing Lifters.* Available too are strong, commodious 5-drawer units with plastic-faced, canvas drawing protectors; and 2- and 3-drawer Vertical filing units.

Many units interlock in a single, compact UnitSystem installation. Such convenience and protection can save you thousands of dollars in irreplaceable work —and time. For details on *any* item produced by the world's largest manufacturer of drafting equipment, see your Hamilton dealer now!



Tracing Lifter holds sheets down firmly, smoothly. Front half raises to let sheets be folded over and back, until desired drawing is found and easily slipped out. Standard equipment in the 10-drawer unit.

Hamilton Manufacturing Company

Two Rivers, Wisconsin

Building trades wage rates—September 1, 1953

Quoted in $/hr., 8-hr. day; time and one-half for overtime after 40 hr. except where noted.

Compiled by ENR

City and State		Car-penters	Brick-layers	Struct Irwkrs	Reinf Irwkrs	Labor Bldg	Labor, HvyConstr	Stone-masons	Mason's Helpers	Plasterers	Mosaic & Terrazzo	Tile Layers	Cement Finishers	Lathers	Electrns (Inside)	Painters	Glaziers	Plumbers	Steam-fitters	Roofers	Water-proofers	Sht Met Workers	Welders	Hoist Eng 1-Drum	Hoist Eng 2-Drum	Tract Op (30-hp+)	Shovel Operator	Truck Dr (1½T+)
Atlanta, Ga	l	2.50	3.10	2.75	2.50	1.28	1.28	3.10	1.28	2.90	3.10	3.10	2.45	2.75	2.75	2.35	2.35	2.90	2.90	1.75	2.60	2.50	1.75	2.15	2.50	2.23	2.75	1.50
Austin, Tex	k	2.33	3.30	2.70	2.43	1.00	1.00	3.00	1.25	3.00	2.75	2.75	[1]2.38	[2]3.13	2.75	2.13	....	2.75	2.75	[A]1.65	....	2.75	*	2.20	2.50	[B]2.20	2.50	[C]0.85
Baltimore, Md	l	2.75	[a]3.20	[b]3.28	[b]2.98	1.68	1.68	[a]3.25	[b]1.78	[b]3.08	[b]2.95	[b]2.95	[b]2.83	[b]2.95	§2.88	2.36	2.38	[b]2.98	[b]2.98	[3]2.20	2.20	[a]2.99	*	[D]2.45	[E]3.10	[F]2.25	[E]3.10	1.55
Billings, Mont	f	2.35 d§	[d]3.00	2.60 d§	2.60 d§	1.76 d§	1.80 d§	3.25 d§	2.25 d§	[d]2.40	[d]2.50	2.62 d§	2.48 d§	2.50 d§	2.49 d§	2.35 dG	[d]2.50	2.65 d§	2.60 d§	2.30 d§	2.30 d§	2.35 d§	[d]2.44	[d]2.22	[d]2.44	[d]2.44	2.44 dH	1.68 d§
Birmingham, Ala	jj	2.40	3.15	[b]2.83	[b]2.83	1.30	1.40	3.15	....	2.62	3.15	3.15	2.48	2.25	2.88	2.48	2.25	[b]2.95	[b]2.95	2.15	2.10	[b]2.65	....	2.25	2.53	2.39	2.53	1.37
Bismarck, N D		2.10	3.00	2.70	2.60	1.45	1.45	3.00	1.65	2.75	....	3.00	2.15	1.75	2.35	1.97	1.97	2.30	2.30	2.00	2.00	2.25	*	2.00	2.15	2.00	2.25	1.48
Boise, Idaho	d	2.45	3.10	2.70	2.45	1.93	1.90	....	2.30	2.90	....	....	2.59	2.90	2.60	[4]2.40	2.40	2.63	2.63	2.21	....	2.42	2.70	2.25	2.35	[I]2.40	2.85	2.05
Boston, Mass	m	2.75	[e]3.19	[b]3.08	[b]3.08	[f]1.99	[f]1.99	[e]3.19	[f]2.16	[e]3.20	[f]3.06	[e]3.09	[e]3.23	[e]3.20	[h]3.12	[bb]2.55	[f]2.56	3.10 e§	2.95 e§	[e]2.88	[e]2.78	[i]2.96	[i]2.96	[i]3.30	[i]3.30	[i]2.93	[i]3.30	2.08 b§
Buffalo, N Y		2.91	[i]3.22	2.94	2.94	2.18	2.18	....	....	3.12	....	[i]2.90	2.77	3.01	3.00	2.67	2.48	3.00	2.90	2.66	....	2.82	....	2.94	....	....	....	2.03
Burlington, Vt	g	2.25	3.00	[m]3.24	[m]3.24	1.38	1.54	3.00	1.54	3.00	....	2.25	3.00	2.25	1.93	1.65	2.25	1.90	1.90	2.26	....	2.26	....	2.50	2.50	2.50	2.50	1.55
Charleston, S C		2.25	2.50	2.75	2.50	1.00	1.00	2.50	....	2.50	2.50	2.50	2.00	2.00	2.50	1.75	1.75	2.75	2.75	1.75	....	2.00	....	1.85	2.15	1.60	2.40	1.25
Charleston, W Va	jj	2.75	3.30	[b]2.90	[b]2.90	1.70	1.70	3.30	1.85	2.60	3.05	3.05	2.35	2.39	2.85	[7]2.75	2.30	2.90	2.90	[8]2.33	2.33	2.63	*	2.75	2.75	2.75	2.75	1.80
Charlotte, N C		2.05	2.75	2.38	2.13	1.05	1.05	2.50	1.05	2.25	2.50	2.50	2.00	2.25	2.40	[9]1.75	1.65	2.50	2.50	1.38	....	2.20	....	1.63	1.88	2.13	2.25	1.00
Chicago, Ill	n	[a]3.15	[b]3.40	[a]320	[a]3.20	[b]2.35	[b]2.35	[b]3.40	[b]2.35	[n]3.53	3.15	[b]3.18	[a]3.15	[n]3.53	[o]3.37	[b]3.08	[j]3.32	[cp]3.24	[qj]3.24	[a]3.30	[a]3.30	[bj]3.23	[a]3.20	[a]3.00	[a]3.00	[a]2.75	[a]3.35	[10]1.75
Cincinnati, Ohio	o	2.93	3.23	[br]3.06	[br]2.90	2.02	2.02	3.23	2.22	[12]3.05	3.00	[12]2.95	[13]2.63	2.95	[a]3.03	[14]2.50	2.76	[15]3.00	[15]3.05	[12]2.85	[13]2.58	2.90	*	3.00	3.00	2.75	3.00	[16]1.90
Cleveland, Ohio	jj	3.20	[b]3.25	[b]3.20	[b]3.20	2.45	2.45	[b]3.25	2.45	3.20	3.03	3.03	3.03	3.20	3.20	[a2]2.93	[b]3.03	[a]3.20	[a]3.20	3.08	3.08	3.13	2.95	3.20	3.20	2.63	3.20	[a]2.25
Columbus, Ohio	p	2.68	3.30	[b]3.00	[b]3.00	1.85	1.87	3.15	2.05	2.88	2.58	2.58	2.58	2.88	2.93	[17]2.50	2.30	2.88	2.88	2.40	2.58	[b]2.83	[b]2.78	2.75	2.75	3.00	2.95	[18]1.85
Concord, N H		2.25	3.00	[b]3.10	[b]3.10	1.70	1.70	3.00	1.90	3.00	3.00	3.00	3.00	3.03	2.25	1.60	....	2.35	2.35	1.90	....	2.00	2.35	[a]2.73	[a]2.73	2.15	2.65	1.65
Dallas, Tex	q	2.63	3.50	2.75	2.50	1.40	1.40	3.50	1.55	3.44	2.75	2.75	2.63	3.44	2.90	2.50	2.23	2.90	2.90	2.15	....	2.81	2.90	2.50	2.75	2.63	2.63	1.57
Dayton, Ohio	a	[b]2.80	[b]3.32	[b]2.90	....	[b]1.98	[b]1.92	3.32	....	[b]2.97	3.05	3.05	[b]2.62	[b]3.00	[b]3.19	[b]2.67	2.55	3.05	3.05	[19]2.58	2.58	2.80	*	2.80	2.80	3.08	3.08	2.03
Denver, Colo	h	2.78	3.50	2.75	2.75	1.80	1.30	3.50	2.20	3.30	3.13	3.13	2.78	§3.30	3.00	2.54	2.45	2.97	2.97	2.75	2.75	2.78	*	2.54	2.71	2.54	2.71	1.83
Des Moines, Iowa		2.63	3.50	2.83	2.83	1.91	1.91	2.63	[J]1.91	2.63	2.63	2.63	2.63	2.63	[b]3.08	[20]2.45	2.25	[b]3.08	[b]3.08	2.05	....	2.73	*	2.45	2.63	2.63	2.63	2.10
Detroit, Mich	a	[q]3.08	[q]3.33	[q]3.23	[q]2.93	[q]2.33	[q]2.33	[q]3.33	2.25	3.42 ee	[a]3.05	[a]3.05	[q]2.88	3.43 av	3.41 wx	[a]2.85	[y]2.55	3.08 bdy	3.08 bdy	[b]3.40	[q]2.88	[a]3.10	[a]3.15	[q]3.23	[a]3.23	[q]3.08	[q]3.08	2.20 ad
Duluth, Minn	jj	[b]2.48	2.92	§2.70	§2.45	[b]1.83	[b]1.83	2.92	[b]1.93	2.88	....	2.50	[b]2.31	2.68	[bs]2.86	[b]2.38	[b]2.23	2.65	2.65	[b]2.53	[b]2.53	[b]2.60	*	2.65	2.65	2.65	2.87	1.92
Fort Worth, Tex	r	2.50	3.44	2.75	2.50	1.25	1.25	3.44	1.50	3.13	2.63	2.63	2.50	3.33	2.75	2.50	2.23	2.75	2.75	[21]2.20	3.44	2.75	2.75	2.50	2.75	2.75	2.75	2.00
Harrisburg, Pa	s	2.48	3.00	3.12	2.86	1.68	1.68	3.00	1.68	2.75	3.00	3.00	2.70	2.75	2.75	2.00	2.17	2.63	2.63	1.95	1.95	2.55	*	3.15	3.15	2.78	3.40	1.70
Houston, Tex	t	§2.49	3.30	§2.63	§2.49	1.55	1.55	3.30	1.75	3.18	§2.76	§2.76	§2.49	3.18	3.00	2.48	2.48	2.75	2.90	2.45	2.45	2.88	§2.21	§2.65	§2.65	§2.65	§2.65	1.80
Indianapolis, Ind	c	[22]2.85	3.25	[b]3.03	[b]3.03	1.95	....	3.25	....	3.00	3.00	3.00	2.53	2.88	3.00	2.60	2.70	3.00	3.00	2.30	3.00	2.87	3.00	2.93	3.00	....	3.00	[a]2.05
Jackson, Miss		2.25	3.00	2.55	2.30	1.05	1.05	....	....	2.50	2.75	2.75	2.50	2.25	2.65	2.13	....	2.65	....	[23]1.75	1.65	2.45	....	2.25	2.25	2.25	2.50	1.35
Jacksonville, Fla	u	2.40	[2]2.86	2.61	2.33	1.00	1.00	[2]2.86	1.10	2.63	2.50	2.50	[2]2.03	2.63	[24]2.85	[25]2.10	2.05	3.00	3.00	2.15	2.15	2.35	*	2.30	2.30	1.89	2.30	1.50
Kansas City, Mo	v	2.66	3.63	2.81	2.67	1.98	1.98	3.25	2.18	3.25	2.90	2.90	2.64	2.97	2.99 aaa	2.58	2.75	2.98 b§	[b]3.08	2.50	2.50	[b]3.07	*	2.64	2.89	2.09	2.89	[27]1.94
Los Angeles, Calif	w	2.70	[i]3.29	[b]2.93	2.74	2.05	2.05	[i]3.29	2.30	3.50 bb	2.77	3.01 cc	2.70	3.38	3.10	2.74 ‡a	2.58 by	[a]3.23	[a]3.23	2.82 dd	2.82 dd	2.92 dd	*	2.57	2.57	2.65	2.88	2.13
Louisville, Ky		§2.55	3.17	2.85	2.53	1.80	....	....	....	3.00	....	....	2.70	2.75	2.85	2.50	2.36	2.78	....	2.08	....	2.75	*	2.90	2.90	....	....	1.82
Meridian, Miss	gg	2.25	2.75	....	....	0.80	[K]0.75	2.75	[L].90	2.35	2.75	2.75	2.25	2.25	2.50	2.00	2.50	2.50	2.50	1.85	2.35	2.45	2.45	....	....	[M]1.50	[N]1.75	1.61
Milwaukee, Wis	b	[a]2.94	[a]3.20	[a]2.90	[a]2.79	[a]2.18	[a]2.18	[a]3.20	[a]2.29	[w]3.02	2.90	[a]2.89	[a]2.73	[w]3.02	[aa]3.00	[f]2.71	2.67	[w]3.00	[w]3.06	[q]2.63	[w]2.62	[w]2.80	[a]2.90	[a]2.73	[a]2.73	[a]2.89	[a]3.06	[a]2.23
Minneapolis, Minn	y	2.70	3.13	2.82	2.72	1.95	1.95	3.13	1.95	§2.90	2.68	[d]2.70	2.85	§2.90	[ff]3.00	2.55	§2.26	2.88	2.88	2.50	2.50	[b]2.85	*	2.65	2.65	[O]2.28	[P]2.72	1.92
Nashville, Tenn	x	2.18	3.03	2.50	2.34	1.15	1.30	3.03	1.30	2.75	2.63	2.63	2.25	2.63	2.70	2.25	2.75	2.75	2.75	1.98	....	2.35	*	2.00	2.25	1.88	2.45	1.40
New Orleans, La	z	2.42	3.05	[a]2.80	[a]2.80	1.38	1.38	3.05	1.48	2.63	....	....	2.42	[a]2.65	[a]2.93	2.13	[a]2.40	[a]2.85	[a]2.85	[a]2.28	....	[a]2.50	[a]2.50	2.60	2.60	2.05	2.60	1.48
New York City		3.43 dgg‡	3.87 hh‡	3.76 e	§...	2.20 dgg	2.20 dgg	[d]3.76	§...	4.00 #ii	3.45 cm	[ee]3.41	3.53 ‡ii	3.53 ‡ggm	3.63 #kk	3.09 ‡ggm	3.53 ‡e	3.61 ‡ll	3.60 ‡cm	§...	§...	3.60 ‡cm	....	3.69 ‡ggd	3.69 ‡ggd	2.93	3.80	1.93
Newark, N J	a	3.50 ‡e	3.76 ‡c	3.76 cm	3.76 cm	‡2.59	....	....	‡2.59	3.76 ‡c	....	....	3.76 ‡e	‡3.50	[a]3.54	3.22 ‡emm	....	3.45 cm	3.45 em	[b]3.37	....	3.42 ‡bm	*	[a]3.50	[a]3.50	[a]2.75	[a]3.50	....
Oklahoma City	hh	2.53	3.50	2.63	2.63	1.60	1.60	3.50	1.75	3.30	2.75	2.75	2.60	2.30	2.88	2.35	2.20	2.80	2.80	2.24	....	2.70	....	....	2.38	2.13	2.38	1.60
Omaha, Nebr	ii	[b]2.63	3.13	2.75	2.75	1.80	1.80	3.13	1.80	3.00	2.70	2.70	2.58	2.85	2.90	2.25	2.25	[b]2.88	[b]2.88	2.13	2.13	2.63	§1.71	2.45	2.80	2.00	2.80	1.80
Philadelphia	e	3.10	3.62 hp	3.49 nn	3.09 nn	1.88	1.95	3.13	1.95	[b]3.48	3.21	3.15 oo	3.10	[b]3.33	3.45 pp	[b]2.58	2.77	[rr]3.52	[rr]3.52	[a]2.93	*	[a]3.26	*	[a]3.35	[a]3.60	[R]2.88	[S]3.50	[b]1.83
Phoenix, Ariz	d	2.58	3.50	2.90	2.58	1.93	1.93	3.50	....	3.30	3.50	3.50	2.58	3.15	2.88	2.50	2.29	2.75	2.75	2.40	....	2.66	2.75	....	....	....	2.70	2.03
Pittsburgh, Pa	a	[b]3.20	[b]3.48	[b]3.40	2.75	[b]2.03	[b]2.03	....	....	[b]3.30	....	....	....	....	3.35	3.05	....	3.25	[rr]3.52	2.88	2.88	3.15	2.75	[b]340	3.40	2.85	3.25	2.03
Portland, Ore	aa	2.55	3.28	2.75	2.55	2.10	2.10	3.28	2.45	3.05	2.90	2.90	2.60	2.95	2.85	2.42	2.50	2.85	2.85	2.55	2.55	2.60	....	2.45	2.75	2.45	2.80	2.10
Providence, R I	bb	2.45	3.04	2.85	2.85	1.80	1.80	2.75	1.80	3.05	2.48	2.48	2.75	3.05	265	2.15	2.43	2.70	....	2.55	....	2.55	....	3.20	3.20	....	3.20	1.72
Richmond, Va		2.05	2.75	2.65	2.40	1.05	1.30	2.75	1.30	2.56	2.50	2.50	1.95	2.62	2.50	2.40	....	2.63	2.63	2.05	....	2.32	2.24	1.96	2.24	2.24	2.40	1.27
St Louis, Mo	a	[b]2.98	[m]3.55	[b]3.10	[b]3.10	[b]2.05	[b]2.05	[m]3.55	2.40	[b]3.25	3.00	2.90	[a]3.15	[b]3.25	3.28 qez	2.83 b28	[b]2.98	[b]3.08	3.05 tt	[29]2.90	....	[b]3.13	2.40	2.45	3.00	3.00	3.00	2.03
St Paul, Minn	y	2.70	3.13	2.82	2.72	1.95	1.95	3.13	1.95	§2.90	2.68	[d]2.70	2.85	§2.90	[ff]3.00	2.55	§2.26	2.88	2.88	2.50	2.50	[b]2.85	*	2.65	2.65	[O]2.28	[P]2.72	1.92
Salt Lake City		2.30	3.00	2.43	2.35	1.70	1.70	....	....	3.00	....	2.50	2.15	2.75	2.75	[30]2.35	2.50	2.65	2.65	2.15	....	§2.40	2.50	2.20	2.30	[31]2.35	2.50	1.93
San Antonio, Tex	cc	2.35	3.15	2.75	2.25	1.15	1.15	3.15	1.42	3.00	2.25	2.25	2.50	3.00	2.75	2.25	2.25	2.81	2.81	[32]1.80	2.00	2.75	2.04	2.08	2.35	2.35	2.35	1.93
San Diego, Calif	w	2.70	3.38	2.70	2.74	2.05	2.05	3.38	2.25	3.25	2.67	2.67	2.70	3.25	3.00	2.53	2.26	2.90	2.90	2.35	2.35	2.62	*	2.57	2.57	2.65	2.18	2.13
San Francisco	dd	[b]2.91	[b]3.48	[b]3.08	[b]2.83	[b]2.08	[b]2.08	[b]3.48	[b]2.78	[b]3.45	[b]2.84	[b]3.08	[b]2.75	3.25	3.29 bss	2.79 ‡ww	[b]2.63	3.23 ss	3.23 ss	[b]2.83	[b]2.83	[b]2.93	*	[a]2.76	[a]2.76	[a]2.87	[a]3.20	[b]2.16
Santa Fe, N Mex	jj	2.60	3.50	2.45	2.20	1.65	1.65	....	1.40	3.00	2.33	1.55	2.33	2.50	2.75	2.38	1.82	2.88	2.50	2.00	2.00	2.75	2.45	2.20	2.35	2.20	2.35	[T]1.50
Seattle, Wash	ee	2.58	3.30	2.78	2.78	2.18	[a]2.24	3.30	2.43	3.15	2.98	3.05	2.58	3.05	2.93	2.58	2.38	§2.75	2.90	2.58	2.58	2.73	2.90	2.71	2.71	2.66	3.01	2.34
Tacoma, Wash	ff	2.58	3.45	2.78	2.58	2.18	2.21	3.45	2.60	3.10	2.98	2.98	2.67	2.90	2.75	2.58	2.48	2.75	2.75	2.58	2.58	2.83	....	2.71	2.71	2.66	3.01	2.34
Toledo, Ohio	a	[w]3.02	[w]3.28	[w]3.17	[w]2.99	[w]2.29	[w]2.29	[w]3.28	[w]2.42	[w]3.17	....	[w]3.10	[w]3.17	[w]3.17	[w]3.17	2.79 w33	[w]2.62	[w]3.17	[w]3.17	[w]2.77	[w]2.77	[w]2.90	*	3.10	3.10	2.82	3.10	1.95
Topeka, Kans	j	2.37	3.15	2.81	2.66	1.60	....	3.15	1.70	3.00	3.15	2.50	2.50	2.25	2.80	2.23	....	2.80	2.80	....	....	2.50	*	2.25	2.65	2.25	2.75	1.80
Trenton, N J	a	3.15	3.35	3.73 fm	3.73 fm	2.15	[12]2.11	3.35	2.15	3.35	3.35	3.35	3.35	3.15	[a]3.60	2.73	2.75	[b]3.33	[b]3.33	[a]3.10	[a]3.10	[a]3.35	[b]3.33	[a]3.50	[a]3.50	[a]3.25	[a]3.50	2.00
Tulsa, Okla	hh	2.63	3.45	2.63	2.63	1.60	1.60	3.45	1.75	3.25	....	....	2.75	....	3.00	2.60	....	2.91	....	....	....	....	....	2.25	2.38	2.13	2.63	1.85

NOTE: Rates rounded to nearest cent   * Same as craft doing work   ‡ 7-hr day   # 6-hr day   § Negotiating   [1] $2.50 11/1/53   [2] 5¢ incr 11/1/53   [3] Comp. Slate & tile $2.48   [4] Brush. Spray $3.12   [6] $2.60 6/1/54   [7] Spray, steel & indus. House $2.50, bridge $3.00   [8] Comp., slate & tile   [9] Brush. Spray $2.20   [10] Less than 2T   [12] 5¢ incr 12/1/53   [13] 2½¢ incr 12/1/53   [14] Home. Com'l $2.60, indus $2.70   [15] 5¢ incr 11/30/53   [16] 10¢ incr 1/16/54   [17] Brush. Spray $2.75   [18] dump   [19] Comp. Slate, tile & asb $2.80   [20] Brush. Spray $2.70   [21] Comp. Tile $2.35   [22] $2.93 11/1/54   [23] Comp. Slate $2.00   [24] $3.00 12/14/53   [25] Brush. Spray $2.51   [27] Flatbed   [28] Brush. Spray $3.08   [29] Comp. Tile $2.65   [30] Brush. Spray $2.50   [31] Cat skinner   [32] Comp. Slate, tile & asb $2.15   [33] Brush. Spray $3.02

RANGES: [A] 1.65–2.15   [B] 2.20–2.50   [C] 0.85–1.25   [D] 2.45–2.60   [E] 3.10-3.25   [F] 2.25–2.38   [G] 2.35–2.50   [H] 2.44–2.84   [I] 2.40–2.55   [J] 1.91–2.01   [K] 0.75–1.00   [L] 0.90–1.25   [M] 1.50–1.75   [N] 1.75–2.00   [O] 2 28–2.72   [P] 2.72-2.98   [R] 2.88–3.13   [S] 3.50-3.75   [T] 1.50–1.78

BENEFITS: [a] Incl 5¢ WF   [b] Incl 7½¢ WF   [c] Incl 3% WF   [d] 6 PH   [e] Incl 10¢ WF   [f] Incl 6¢ WF   [g] Incl 15¢ WF   [h] Incl 12¢ WF. Pension: Max $50 per mo at 65 after 20 yr member, less 20 yr, less pension   [i] Incl 11¢ WF   [j] Incl 10¢ PF   [k] Incl 8¢ PF   [l] Incl 8¢ PV   [m] Incl 3% PF   [n] Incl 22½¢ W, P, lump sum   [o] Incl 6% WF   [p] Incl 15¢ PF   [q] Incl 8¢ WF   [r] Incl 7½¢ PF   [s] Incl 1% WF   [t] Incl 9¢ WF   [u] Incl 6¢ PF   [v] Incl 4% PV   [w] Incl 7¢ WF   [x] Incl 6% PV   [y] Incl 1 wk vac   [z] Incll 1% PF   [aa] Incl 2% WF   [bb] Incl 6¼¢ WF   [cc] Incl 2½% WF   [dd] Incl 6½¢ WF   [ee] Incl 5¾¢ W&PF   [ff] Incl 20¢ H, W, Ins., Vac & Retirement   [gg] Incl 4% WF   [hh] Incl 3½% WF plus 20¢ PF   [ii] Incl 10¢ WF, 10¢ PF, 20¢ BF   [jj] Incl 3½% WF, 3½% PF   [kk] Incl 5% PF, 4% VF, 1% NC, 6 PH plus $1.00/day travel time   [ll] Incl 3% WF plus 8% addnl benefits   [mm] Incl 11½¢ PF   [nn] Incl 10½¢ WF, 1½% PF   [oo] Incl 12½¢ WF   [pp] Incl 1½% PF   [rr] Incl 11½¢ WF   [ss] Incl 5% W&PF   [tt] Plus 5% travel pay   [uu] Incl 8½¢ WF   [vv] Incl 10¢ WF, 2½¢ PF, 10¢ PV

OVERTIME: **a** DT   **b** DT Sat & Sun   **c** DT Sat, Sun & Hol   **d** DT Sun & Hol   **e** DT (DT Sun) lab   **f** DT brick   **g** DT brick, stone mas, plast, cement   **h** DT carp, brick, iron, stone mas, plast, mos & ter, tile, lath, sheet met   **i** DT iron, stone mas, mos & ter, tile, cement, lath, glaz, plumb, steamf, sheet met   **j** DT plast, mos & ter, plumb   **k** DT all but carp, plast, cement; (TH 5–9 PM & Sat) elect; paint, (TH 5–12 PM & Sat) plumb, steamf; (TH first 3½ hrs) sheet met   **l** DT all but lab, roof, waterp tr dr   **m** DT all but (TH M-F 7–8 am; 4:30–6:30 pm) lab; (TH M-F 4:30–7 pm) cement; (TH M-F 5 pm–12 N) paint; (DT Sun & Hol) glaz, oper engr   **n** DT all but (TH first 2½ hrs, Sat 8 am–12 N) lab, mas help; (TH first 2½ hrs) cement; elect, paint, plumb, steamf, tr dr   **o** DT all but paint   **p** DT all but lab, glaz   **q** DT all but (DT Sun) carp; lab, mas help, mos & ter, tile; (DT Sat, Sun & Hol) cement; elect, paint, glaz, roof   **r** DT except lab, elect, paint, glaz   **s** DT except lab, paint, tr dr   **t** DT all but lab, mas help, mos & ter, tile, cement, paint, glaz, plumb, steamf, roof, waterp   **u** DT all but mos & ter, tile, paint, oper engr, tr dr   **v** DT all but lab, tile, paint, plumb, steamf, roof, waterp, tr dr   **w** DT all but reinf iron, lab, mos & ter, tile, cement, paint, glaz, roof, waterp, sheet met, oper engr, tr dr   **x** DT all but lab, mas help, cement; (DT Sat, Sun & Hol) lath; paint, roof, sheet met   **y** DT Sat, Sun, Hol; (DT) brick, iron, oper engr   **z** DT all but (DT Sat, Sun & Hol) lab, mas help; cement, lath, tr dr   **aa** DT all but cement, paint, sheet met, tr dr   **bb** DT all but mos & ter, tile, paint, glaz, tr dr   **cc** DT all but cement, elect, paint, glaz, plumb, steamf, roof, waterp, tr dr   **dd** DT all but (TH first 4 hrs) carp; (TH first 2 hrs) cement, glaz, roof, waterp; (DT Sun) lab; (TH) mos & ter, paint, plumb, steamf, tr dr   **ee** DT all but cement, paint, glaz   **ff** DT all but glaz; (DT within city limits of designated cities, TH outside) hvy lab, oper engr   **gg** DT carp; (DT Hol) paint; plumb   **hh** DT brick, iron, stone mas, plast   **ii** DT carp, brick, iron, stone mas, plast, cement, lath, oper engr   **jj** No data given

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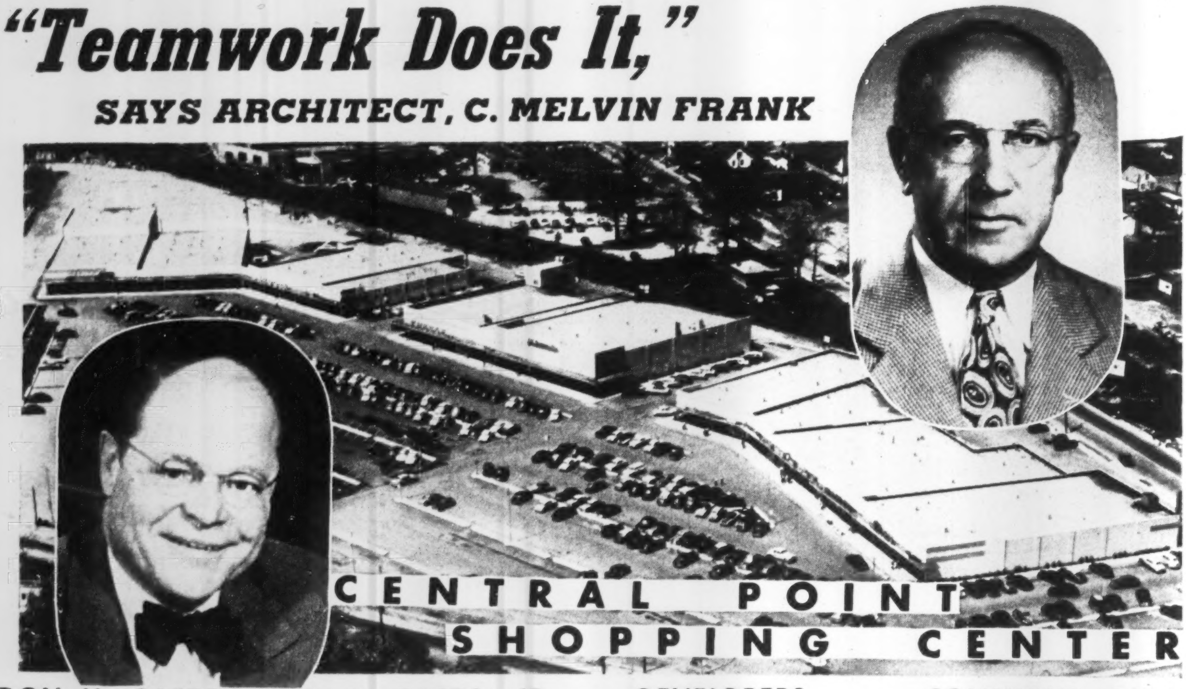

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Year	Carpenters	Bricklayers	Masons' Laborers	Common Laborers	Structural Ironwkrs
1874	$0.23 (10 hrs.)	$0.43 (8 hrs.)	$0.18 (8 hrs.)	$0.14 (10 hrs.)	......
1890	.43 (8 hrs.)	.47 (8 hrs.)	.28 (8 hrs.)	.14 (9 hrs.)	...... (8 hrs.)
1907	.63	.70	.38	.22 (8 hrs.)	$0.60
1913	.63	.70	.38	.23	.63
1930	1.65	1.93	1.03	1.03	1.93
1932	1.33 (7 hrs.)	1.47 (7 hrs.)	1.00 (7 hrs.)	.65	1.68
1938	1.75	1.89	1.00	.91	1.93
1939	1.75	1.89	1.03	.91	1.93
1942	1.85	2.00	1.03	.95	2.00
1946	2.10	2.25	1.23	1.20	2.25
1947	2.47	2.65	1.44	1.44	2.56
1948	2.73	2.94	1.62	1.63	2.98
1949	2.75	3.20	1.70	1.70	3.00
1950	2.88	3.30	1.78	1.78	3.14
1951	3.09	3.548	1.90	1.90	3.348
1952	3.152	3.674	1.962	1.962	3.411

NYC workers also got these benefits.

- **WELFARE:** 3%—carpenters, bricklayers, struct. iron workers, reinf. iron workers,* sheet metal workers,* common labor, plasterers, mosaic & terrazzo,* cement finishers,* lathers,* glaziers,* lumbers & steamfitters,* roofers,* waterproofers,* welders, hoisting engineers, shovel operators; 4%—mason's helpers, painters; 5% welfare and pension—electricians. *Also 3% pension.

- **PENSION:** 2% — mason's helpers, plumbers; 3%—see welfare; 20¢ hr—bricklayers, plasterers.

- **PAID HOLIDAYS**. 6 ea—carpenters, struct, iron workers, common labor, electricians, welders, hoisting engrs, shovel operators.

- **HOSPITAL & HEALTH:** 5%—stone masons, tile layers; 8%—plumbers in Manhattan and Bronx.

- **COST OF LIVING ESCALATORS:** most trades.

- **CONTRACT STATUS:** 3-yr contract for laborers, mosaic and terrazzo, steamfitters; 2-yr for carpenters, structural ironworkers, cement finishers, lathers, glaziers, sheet metal and plumbers; electricians expire 12/31/53; bricklayers 5/31/54; painters 7/31/54; stone masons 7/1/55; tile layers 8/3/55. Information not available for roofers and waterproofers. All trades with exception of bricklayers got 15¢/hr increase, July, 1953.

Consumer price index

US Bu of Labor Statistics

New series—1947-49 = 100

	1939#	1945#	1948#	1949#	1950#	1951#	1952#	1953*
Jan	59.6	76.1	101.3	102.7	100.6	108.6	113.1	113.9
Feb	59.4	76.0	100.5	101.6	100.4	109.9	112.4	113.4
Mar	59.3	76.0	100.2	101.9	100.7	110.3	112.4	113.6
Apr	59.2	76.1	101.6	102.1	100.8	110.4	112.9	113.7
May	59.1	76.7	102.3	101.8	101.3	110.9	113.0	114.0
Jun	59.0	77.3	103.1	102.0	101.8	110.8	113.4	114.5
Jul	59.2	77.5	104.3	101.4	102.9	110.9	114.1	114.7
Aug	59.0	77.5	104.8	101.6	103.7	110.9	114.3	115.0
Sept	60.2	77.2	104.8	102.1	104.4	111.6	114.1	.....
Oct	60.0	77.2	104.3	101.5	105.0	112.1	114.2	.....
Nov	59.9	77.5	103.5	101.6	105.5	112.8	114.3	.....
Dec	59.6	77.8	103.0	101.0	106.9	113.1	114.1	.....

Pre-depr. high: 77.0, Nov 1925—Depr. low: 53.6, Apr 1933.
* Official beginning January '53. For details of latest revision see the February '53 Monthly Labor Review.
# Interim adjusted series converted from 1935-39 = 100 1947-49 = 100 base.

Old series—1935-39 = 100

	Old series†					Interim adjusted*		
	1939	1950	1951	1952	1953	1950	1951	1952
Jan	....	166.9	181.6	190.2	190.3	168.2	181.5	189.1
Feb	....	166.5	184.2	188.3	186.6	167.9	183.8	187.9
Mar	99.2	167.0	184.5	188.4	188.8	168.4	184.5	188.0
Apr	....	167.3	184.5	189.6	188.3	168.5	184.6	188.7
May	....	168.6	185.4	190.4	188.8	169.3	185.4	189.0
Jun	98.2	170.2	185.5	191.1	190.9	170.2	185.2	189.6
Jul	....	172.5	185.8	192.4	†	172.0	185.5	190.8
Aug	....	173.0	185.6	192.3		173.4	185.5	191.1
Sept	101.3	173.8	186.5	191.4		174.6	186.6	190.8
Oct	....	174.8	187.8	191.5		175.6	187.4	190.9
Nov	....	175.6	189.3	191.6		176.4	188.6	191.1
Dec	100.1	178.4	190.0	191.0		178.8	189.1	190.7

† Old series discontinued after June '53.
* Interim adjustments to population and commodity weights are described in Monthly Labor Review Apr '51. This adjusted series discontinued after Dec '52. See table above for new revised index.

Consumer prices dropped a bit, early in 1953, then moved up to another new high by July. With some wage agreements tied to the old series, that is reported here through June 1953, when it was discontinued. From now on, the new series on the 1947-49 = 100 base is official.

Canadian wage and cost of living changes—1945–'52

Unweighted average wage increases for 8 principal construction occupations (including vacation pay allowances)

	Per cent increase in wages				in cost of living			
	'45-'52	'49-'50	'50-'51	'51-'52	'45-'52	'49-'50	'50-'51	'51'52-
Vancouver	96.1	4.8	15.8	7.1	58.1	6.6	11.1	2.4
Edmonton	84.3	3.5	9.2	9.3	49.4	6.4	10.3	4.0
Saskatoon	81.9	3.1	6.3	11.0	50.4	4.2	10.4	3.4
Winnipeg	74.8	5.3	11.3	11.1	50.9	6.7	10.3	3.8
Toronto	86.8	9.8	9.1	3.8	53.4	6.2	11.2	2.8
Montreal	85.3	10.0	11.7	7.8	54.5	6.8	12.5	4.3
St. John	67.6	5.0	10.7	6.0	51.0	6.1	11.0	3.1
Halifax	67.0	1.5	6.8	12.9	45.3	3.5	12.8	3.2
Average, 8 cities	80.6	5.4	10.1	8.6	51.6	5.8	11.2	3.4

Canada construction cost indexes

Control Mortgage and Housing Corporation—1949 = 100

Non-residential				Residential			
Date	Index	Date	Index	Date	Index	Date	Index
'39	57.9	'47	83.9	'39	48.1	'47	80.5
'40	60.0	'48	95.7	'40	51.2	'48	95.0
'41	63.9	'49	100.0	'41	56.0	'49	100.0
'42	67.2	'50	105.1	'42	60.0	'50	106.0
'43	69.5	'51	117.4	'43	63.7	'51	121.7
'44	70.5	'52	123.7	'44	66.4	'52	124.3
'45	71.1	'52 Dec	126.1	'45	67.2	'52 Dec	126.2
'46	75.0	'53 Jul	128.6	'46	70.4	'53 Jul	128.7

Weighted indexes of wholesale prices and wage rates. Intangibles, productivity, etc., not included.

Canadian building trades wage rates July 1, 1953

Dominion Department of Labour, and Canadian Construction Assoc.

	Bricklayers				Carpenters				Electricians				Painters			
	1939J	1945J	1952J	1953	1939J	1945J	1952J	1953	1939J	1945J	1952J	1953	1939J	1945J	1952J	1953
Halifax[a]	$1.00	$1.15	$1.54	$1.69	$0.70	$0.95	$1.33	$1.56	$0.85	$1.06	$1.43	$1.66	$0.60	$0.81	$1.17	$1.32
Saint John	0.90	1.10	1.72	1.80	0.50-0.60	0.81	1.32	1.50	0.50-0.65	0.85	1.35	1.57	0.50-0.55	0.76	1.15	1.34
Quebec[b]	0.75-0.85	1.00	1.45	1.60	0.55-0.60	0.80	1.25	1.40	0.55-0.65	0.80	1.25	1.40	0.50-0.55	0.75	1.20	1.35
Montreal	0.80-0.90	1.06	1.90	1.90[c]	0.70	0.96	1.70	1.70[c]	0.75	1.01	1.80	1.85[d]	0.66	0.86	1.60	1.60[c]
Toronto	1.00	1.23	2.35	2.35	0.90	1.11	2.10	2.20	1.00	1.21	2.20	2.33	0.75	0.97	1.75	1.85[f]
Hamilton	0.90	1.19	2.05	2.15	0.75	1.04	1.85	2.00	0.75	1.05	1.80	2.00	0.65	0.86	1.50	1.65
Windsor	1.15	1.26	2.25	2.25	0.95	1.18	2.00	2.00	1.15	1.26	2.05	2.20	0.60-0.65	0.95	1.60	1.65-1.70
Winnipeg	1.10	1.25	2.00	2.10	0.85	1.05	1.80	1.90	0.85	1.05	1.65	1.90	0.70	0.90	1.55	1.65
Saskatoon	1.00	1.20	2.05	2.13	0.50-0.75	0.96	1.80	1.80	0.70-0.80	0.93	1.65†	1.90[i]	0.50-0.70	0.70	1.30	1.50[j]
Edmonton	1.10	1.31	2.17	2.22	0.90	1.03	1.70	1.85[k]	0.85	1.06	1.80	2.15	0.80	0.91	1.45	1.55
Vancouver	1.10	1.29	2.10	2.32	0.75-0.90	1.12	2.00	2.17	0.75-1.00	1.19	2.10	2.30	0.63-0.80	0.97	1.70	2.07

	Plasterers				Plumbers				Sheetmetal Workers				Labourers			
	1939J	1945J	1952J	1953	1939J	1945J	1952J	1953	1939J	1945J	1952J	1953	1939J	1945J	1952J	1953
Halifax[a]	$0.80	$0.95	$1.45	$1.70	$0.85	$1.02½	$1.40	$1.65	$0.70	$0.85	$1.23	$1.47	0.30-0.40	$0.52	$0.91	$1.06
Saint John	0.90	1.10	1.72	1.80	0.60-0.70	0.88	1.45	1.55	0.50-0.65	0.81	1.15	1.25	0.30-0.40	0.53	0.75-1.15	0.75-1.15
Quebec[b]	0.75	1.00	1.45	1.60	0.55-0.65	0.80	1.25	1.40	0.55-0.65	0.80	1.25	1.40	0.40	0.60	0.95	1.05-1.15
Montreal	0.80	1.06	1.90	1.90[e]	0.75	1.01	1.79	2.00	0.65-0.75	0.96	1.70	1.70[c]	0.40	0.61	1.15	1.15[c]
Toronto	0.90	1.21	2.00	2.15	1.00	1.17	2.00	2.15[g]	0.93	1.18	1.95	2.20[h]	0.35-0.50	0.67	1.10-1.20	1.20
Hamilton	0.90	1.07	2.00	2.15	0.85	1.07	1.95	2.05	0.75	1.04	1.65	2.00	0.35-0.45	0.65	0.85-1.05	1.00-1.10
Windsor	0.90	1.15	2.00	2.00	1.00	1.25	2.05	2.20	0.70-0.85	1.06	2.00	2.00	0.55	0.75	1.10-1.45	1.20-1.50
Winnipeg	1.10	1.25	2.00	2.10	0.95	1.15	1.90	2.00	0.70	0.85	1.65	1.75	0.40-0.45	0.63	0.95-1.15	1.05-1.25
Saskatoon	0.75-1.00	1.06	1.75	2.00	1.00	1.06	1.85	2.00	0.75-0.90	0.81-0.85	1.25	1.03-1.65	0.30-0.40	0.58	1.13	1.23
Edmonton	1.05	1.31	2.00	2.125	1.05	1.16	1.90	2.15	0.90	1.07	2.00	2.05	0.40-0.50	0.61	1.20	1.25
Vancouver	1.00	1.10	2.10	2.25	1.00	1.19	2.10	2.25	1.00	1.18	2.10	2.25	0.45-0.50	0.71	1.40	1.55

J—June 1

[a] 1952 and 1953 rates do not include hourly allowance in lieu of vacation pay [b] All rates increased 5 cents per hour, effective July 11, 1953 [c] Rate increased 10 cents per hour, effective Aug. 24, 1953 [d] $1.90 Nov. 1, 1953 [e] $2.00 July 13, 1953 [f] $1.90 Oct 1, 1953 [g] $2.30 Aug 1, 1953 [h] $2.25 Aug 1, 1953 [i] $2.00 Sept 1, 1953 [j] $1.60 Sept 1, 1953 [k] $1.95 Aug 1, 1953 Note. Vacation pay assessments for above trades are. Montreal—2%; Toronto—4%; except painters and sheetmetal workers; Hamilton—2 to 4%; Windsor—4%; Winnipeg—2%; Saskatoon—4%; Edmonton—4%; Vancouver—2.5%.

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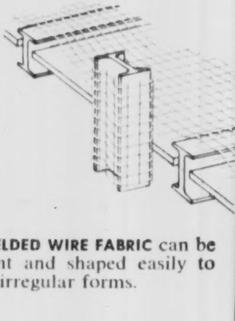

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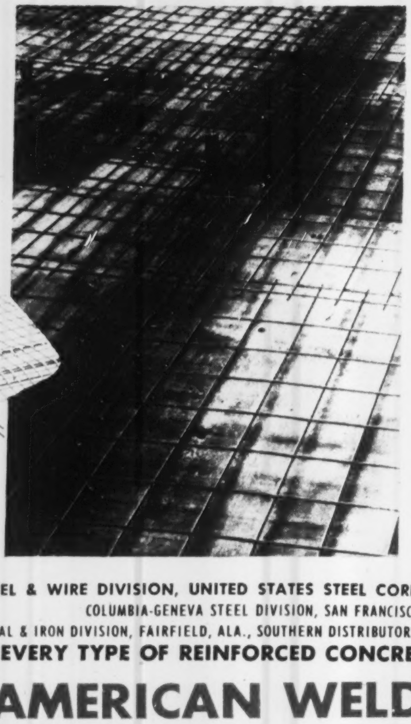

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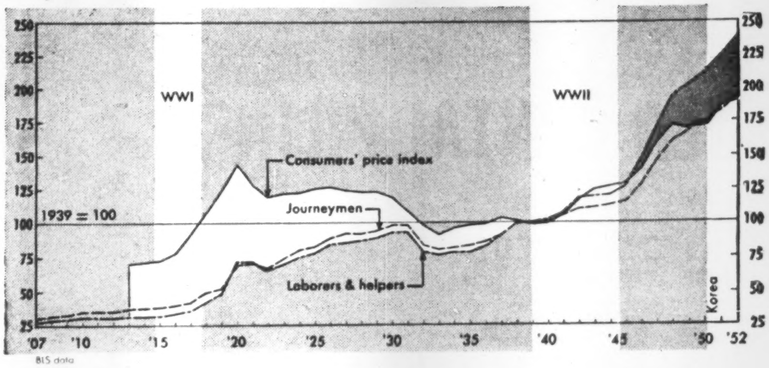

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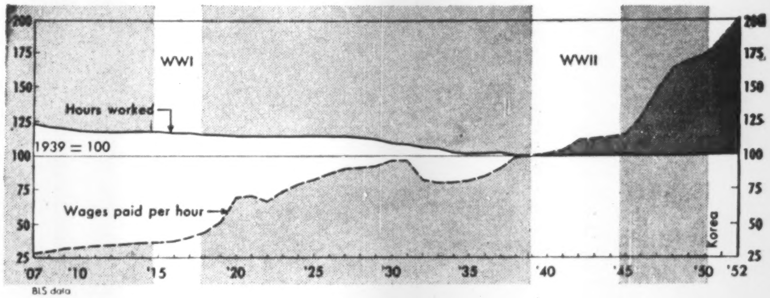


BIS data

Union labor trends reported by US Bu of Labor Statistics

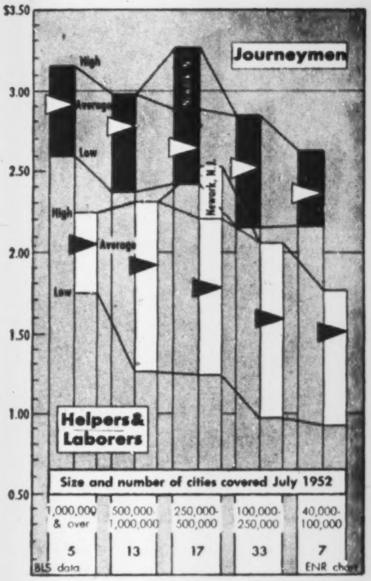
Year	All Building Trades	Journeymen	Helpers & Laborers	Bricklayers	Carpenters	Cement Finishers	Electricians (Inside Wiring)	Glaziers	Lathers	Painters	Plasterers	Plumbers & Gas Fitters	Sheet Metal Workers	Steam & Sprinkler Fitters	Stonemasons	Structural Ironworkers	Building Laborers	Bricklayers' Tenders
Wage rates per hour—Index, 1939 = 100																		
1907M	29.3	29.7	27.3	37.7	29.8	34.5	27.9	....	....	26.2	37.3	33.3	30.6	30.1	33.9	27.9	30.8	30.3
1913M	36.1	36.9	31.8	41.5	36.8	38.0	33.8	....	34.6	35.5	39.3	37.9	35.6	35.0	36.7	37.3	34.2	31.8
1926M	88.3	88.7	84.9	94.1	88.5	86.6	81.5	80.7	83.0	90.9	92.4	83.9	86.3	84.9	92.7	81.1	86.9	85.5
1930M	97.0	97.5	93.3	101.8	96.9	95.4	90.9	92.6	89.6	100.6	98.1	91.5	94.7	93.5	99.1	92.5	92.9	94.9
1932M	83.1	83.6	79.2	87.0	79.6	83.6	87.9	78.0	80.0	85.3	81.4	80.5	83.4	81.0	88.4	81.0	78.7	78.4
1938J	99.3	99.3	99.2	99.5	99.8	99.6	99.5	99.3	96.8	99.2	99.2	99.1	98.6	99.3	99.7	98.9	99.4	99.7
1942	111.9	110.9	117.5	108.3	112.1	110.8	113.5	108.8	109.1	110.5	105.0	110.5	116.0	109.3	108.0	108.7	119.6	115.7
1946	129.3	126.8	146.3	125.6	129.7	128.2	124.9	123.4	124.2	127.3	119.0	123.2	133.0	124.6	126.5	121.4	152.2	141.7
1948	163.5	159.4	192.7	165.6	164.7	161.1	154.4	155.5	157.8	154.4	148.2	158.2	164.4	154.3	166.0	151.9	200.8	185.5
1949	170.3	166.1	199.8	174.0	169.1	165.8	168.1	160.5	164.2	162.1	161.9	162.8	169.6	161.3	175.7	157.4	208.4	190.4
1950	177.8	173.2	210.8	180.4	177.4	172.7	172.3	169.4	179.6	167.7	169.3	166.7	177.9	168.3	187.1	164.8	220.0	203.4
1951	189.1	184.0	225.3	188.0	189.1	183.7	185.4	177.8	188.0	178.7	177.5	176.6	188.1	178.6	193.6	175.7	235.6	213.9
1952	200.8	195.3	240.0	203.9	200.6	192.2	196.0	186.0	194.4	190.2	187.6	187.0	202.2	189.1	207.5	184.0	251.7	228.0
Hours worked per week—Index, 1939 = 100																		
1907M	124.3	123.8	126.1	122.9	121.0	122.7	124.2	....	....	133.1	125.8	120.6	117.0	120.3	118.4	121.3	121.6	118.9
1913M	118.2	118.0	118.3	114.9	115.6	119.8	120.7	....	121.8	125.9	124.3	119.2	114.9	118.0	115.7	114.1	118.3	116.0
1926M	114.9	115.1	113.9	113.3	113.5	113.4	115.9	117.5	118.9	120.7	118.2	116.5	111.8	114.4	114.5	112.8	112.1	113.9
1930M	109.8	110.0	109.0	107.1	109.4	108.1	109.9	112.4	110.4	115.4	113.0	109.9	106.9	108.5	107.1	108.8	110.0	106.9
1932M	106.5	106.6	105.7	103.1	105.0	105.6	106.2	107.9	109.3	114.2	110.1	108.0	103.6	106.4	104.8	104.8	104.9	104.0
1938J	100.2	100.1	100.2	99.0	100.0	100.0	100.3	100.2	100.8	110.4	100.0	99.7	100.0	99.6	100.1	100.1	100.1	100.3
1942	101.1	101.8	98.8	100.8	100.8	100.6	104.6	102.0	102.5	106.5	102.0	99.9	100.9	102.2	100.2	101.1	98.8	98.6
1946	100.2	101.1	97.4	100.3	100.3	100.4	100.5	102.0	102.2	106.1	104.1	98.3	100.8	101.3	100.0	101.1	97.2	96.9
1948	100.1	101.0	97.3	100.5	100.2	100.0	100.5	103.5	98.1	106.2	102.9	97.6	100.1	101.3	101.0	101.1	97.2	96.4
1949	100.2	104.1	97.3	100.1	100.2	100.0	107.2	103.5	98.1	106.2	103.5	97.6	99.9	101.3	100.8	101.1	97.2	96.4
1950	100.3	101.2	97.3	100.1	100.2	100.0	102.2	103.5	101.2	106.2	105.9	98.3	99.9	101.3	100.8	101.1	97.2	96.4
1951	100.2	101.1	97.2	100.2	100.2	100.0	102.2	103.5	101.2	104.9	105.9	98.3	99.9	101.3	100.9	101.1	97.0	96.2
1952	100.2	101.1	97.4	100.2	100.2	100.0	102.2	103.5	101.2	104.9	105.9	98.3	99.9	101.3	100.9	101.1	97.1	96.3

• M May 1. • J June 1. • All others July 1.

Average wage rate increase in 85 cities—January to July

U. S. Bu. of Labor Statistics

	Per cent				Cents per hour				Rates, July 1, 1952			Rates, July 1, 1953		
	1Q		2Q		1Q		2Q		Low	Aver	High	Low	Aver	High
Trade	'52	'53	'52	'53	'52	'53	'52	'53						
Bricklayers	0.7	0.1	1.4	1.7	2.2	0.4	4.3	5.5	$2.50	$3.13	$3.65	$2.50	$3.29	$3.65
Carpenters	0.2	0.2	2.6	2.7	0.3	0.7	6.6	7.3	1.93	2.63	3.40	2.05	2.81	3.40
Electricians	1.1	0.6	2.9	2.2	2.9	1.6	8.2	6.5	2.01	2.88	3.30	2.30	3.00	3.50
Painters	1.2	0.3	2.7	3.9	2.9	0.8	6.7	9.9	1.50	2.57	2.83	1.65	2.71	3.05
Plasterers	2.2	0.3	1.6	1.1	6.5	0.9	4.7	3.4	2.25	3.08	3.65	2.25	3.21	3.65
Plumbers	0.9	0.3	2.5	1.4	2.5	0.9	7.0	4.2	2.19	2.84	3.25	2.50	2.97	3.30
Bldg laborers	0.6	0.5	3.6	3.1	1.0	0.8	6.0	6.2	0.90	1.74	2.56	0.90	1.87	2.59



BLS data

ENR chart

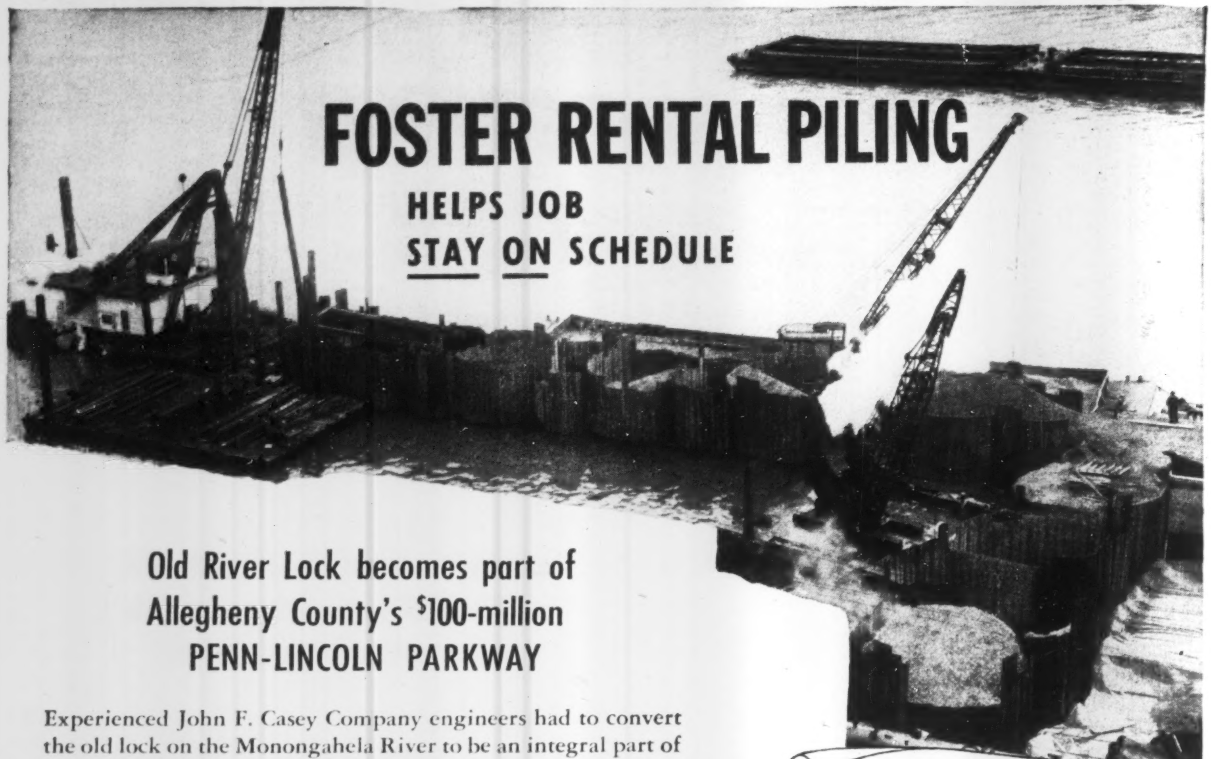
Union wages and hours compared

Wages on July 1, 1953 of workers in the principal building trades again ranged from a low of 90 cents an hour for laborers to a high of $3.65 per hour for bricklayers and plasterers, exclusive of fringe benefits, according to reports by the Bureau of Labor Statistics in 85 cities. These extremes are unchanged from July 1, 1952 but the 1953 averages range from $1.87 per hour for laborers to $3.29 per hour for bricklayers compared with $1.74 to $3.13 the year before. Thus the rate of increase in the averages continues about the same as last year.

Building labors' long term gains are reported in the union labor trends index table and chart shown here through July 1, 1952.

Hours worked went up fractionally for helpers and laborers, for building laborers and for bricklayers' tenders, and held constant for the skilled trades. But laborers and helpers continued to climb faster on the wage index scale than did journeymen. Journeymen gained a little on the consumers price index in 1952.

The BLS wage index for workers in all building trades went up 6.2% between July '51 and '52 while the Consumer's Price Index rose by 2.9%. From July '52 through August '53 this cost of living gage climbed only 0.8%, while the building trades average wages are up 4.2 to 7.5%. By trades the 1953 increases are, in cents per hour and % gain over 1952 rate: laborers 13 cents, 7.5%: carpenters 18 cents, 6.8%; bricklayers 16 cents, 5.1%; painters 14 cents, 5.4%; plumbers 13 cents, 4.6%; and plasterers and electricians 13 cents, 4.2%.



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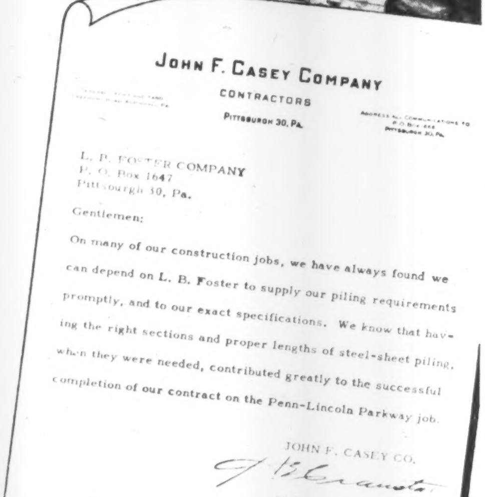

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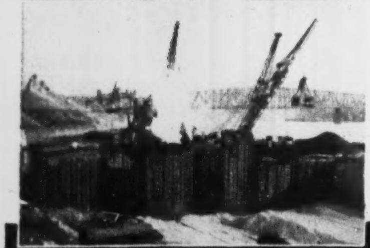

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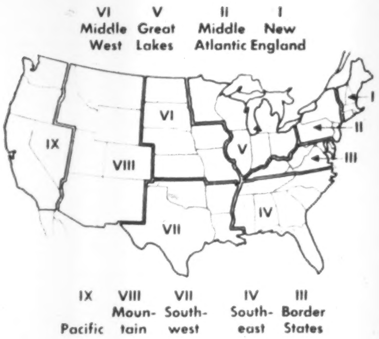

Wages by areas

The two high-wage areas for building trades are Middle Atlantic and Great Lake states with averages of $2.78 and $2.69 an hour as of July 1, 1952 compared with $2.57 for the U. S. average. The two low areas are Southeast and Mountain with $2.13 and $2.26 an hour respectively.

Average earnings

Take-home pay increased again in 1952 about 5.5% on building contract construction. This compares with 9% in 1951. On nonbuilding contracts these increases were 6% for '52, 10.5% for '51.

Average union wage rates in building trades, by region

Bureau of Labor Statistics, July 1, 1952

Trade	United States	I New England	II Middle Atlantic	III Border States	IV Southeast	V Great Lakes	VI Middle West	VII Southwest	VIII Mountain	IX Pacific
All building trades	**$2.57**	**$2.39**	**$2.78**	**$2.40**	**$2.13**	**$2.69**	**$2.55**	**$2.27**	**$2.26**	**$2.53**
Journeymen	**2.76**	**2.58**	**3.04**	**2.67**	**2.42**	**2.82**	**2.70**	**2.50**	**2.56**	**2.63**
Asbestos workers	2.74	2.67	2.94	2.62	2.57	2.80	2.67	2.65	2.68	2.67
Boilermakers	2.78	2.75	3.00	2.72	2.60	2.89	2.56	2.55	2.68	2.75
Bricklayers	3.19	2.93	3.43	3.18	2.84	3.10	3.36	3.12	3.08	3.21
Carpenters	2.68	2.44	3.03	2.57	2.26	2.80	2.65	2.32	2.50	2.46
Cement finishers	2.64	2.92	2.96	2.42	2.25	2.68	2.65	2.38	2.43	2.47
Electricians (inside wiremen)	2.88	2.64	3.22	2.72	2.60	2.91	2.73	2.72	2.69	2.89
Elevator constructors	2.83	2.74	2.96	2.86	2.58	2.82	2.78	2.72	2.63	2.87
Glaziers	2.44	2.21	2.67	2.34	2.17	2.62	2.48	2.11	2.15	2.29
Lathers	3.00	2.94	3.03	2.95	2.51	2.97	2.82	3.03	2.95	3.13
Machinists	2.61	2.75	2.91	2.72	2.38	2.73	2.68	2.20	....	2.50
Marble setters	2.82	2.72	2.94	3.02	2.72	2.72	2.78	2.64	2.80	2.78
Mosaic and terrazzo workers	2.82	2.70	2.98	2.85	2.73	2.73	2.76	2.49	2.94	2.74
Painters	2.57	2.26	2.73	2.40	2.19	2.62	2.46	2.23	2.32	2.64
Paperhangers	2.52	2.03	2.50	2.24	2.25	2.64	2.43	2.14	2.23	2.61
Plasterers	3.10	2.94	3.39	3.01	2.58	3.03	2.99	3.00	3.22	3.12
Plumbers	2.88	2.65	3.09	2.74	2.71	2.89	2.80	2.69	2.67	2.84
Rodmen	2.64	2.77	2.96	2.56	2.25	2.78	2.74	2.35	2.45	2.46
Roofers, composition	2.55	2.48	2.81	2.23	1.97	2.67	2.48	2.04	2.42	2.57
Roofers, slate and tile	2.54	2.61	2.95	2.56	2.11	2.76	2.49	2.12	2.35	2.52
Sheet-metal workers	2.72	2.65	3.03	2.60	2.27	2.80	2.77	2.56	2.37	2.63
Steam and sprinkler fitters	2.85	2.69	3.05	2.69	2.67	2.89	2.81	2.71	2.66	2.84
Stonemasons	3.15	2.95	3.23	3.23	2.88	3.04	3.23	3.16	3.10	3.21
Structural-iron workers	2.81	2.82	3.03	2.85	2.45	2.86	2.70	2.55	2.52	2.70
Tile layers	2.82	2.75	2.96	2.84	2.69	2.72	2.76	2.54	2.90	2.90
Helpers and laborers	**1.84**	**1.85**	**2.01**	**1.62**	**1.21**	**2.01**	**1.95**	**1.31**	**1.75**	**1.95**
Bricklayers' tenders	2.02	1.82	2.24	1.60	1.23	2.07	2.08	1.47	1.96	2.34
Building laborers	1.75	1.83	1.87	1.59	1.17	1.95	1.88	1.23	1.66	1.82
Composition roofers' helpers	1.65	1.85	1.80	1.67	1.05	1.94	....	1.25	....	1.90
Elevator constructors' helpers	2.01	1.93	2.14	1.99	1.81	1.99	1.99	1.91	1.85	2.01
Marble setters' helpers	1.87	1.95	2.09	2.00	1.25	2.09	1.88	1.40	1.90	2.15
Plasterers' laborers	2.10	1.98	2.34	1.78	1.29	2.21	2.19	1.58	1.97	2.75
Plumbers' laborers	1.86	....	1.94	1.60	1.16	2.08	2.02	1.15	1.83	2.01
Terrazzo workers' helpers	2.11	1.99	2.34	1.88	1.64	2.19	2.04	1.42	1.86	2.19
Tile layers' helpers	2.03	1.97	2.28	2.02	1.39	2.04	1.87	1.46	1.95	2.18

Average hourly earnings on contract construction

Bureau of Labor Statistics, dollars per hour

	Building* 1946	1949	1950	1951	1952	Non-Building* 1946	1949	1950	1951	1952	Manufacturing 1946	1949	1950	1951	1952
Jan.	$1.402	$1.918	$1.976	$2.138	$2.273	....	$1.710	$1.753	$1.909	$2.033	....	$1.405	$.1418	$1.555	$1.63
Feb.	1.422	1.930	1.988	2.153	2.291	$1.296	1.714	1.771	1.905	2.059	....	1.401	1.420	1.561	1.64
Mar.	1.411	1.933	1.995	2.171	2.293	1.300	1.703	1.766	1.921	2.055	....	1.400	1.424	1.571	1.65
Apr.	1.423	1.934	1.996	2.178	2.277	1.283	1.709	1.746	1.933	2.069	....	1.401	1.434	1.578	1.65
May	1.431	1.930	1.998	2.179	2.279	1.308	1.712	1.762	1.935	2.062	....	1.401	1.442	1.586	1.65
June	1.444	1.923	1.995	2.194	2.262	1.313	1.712	1.756	1.972	2.049	....	1.405	1.453	1.599	1.65
July	1.473	1.922	2.006	2.195	2.282	1.357	1.712	1.776	1.997	2.083	....	1.408	1.462	1.598	1.64
Aug	1.482	1.932	2.031	2.207	2.321	1.353	1.713	1.793	2.000	2.123	....	1.398	1.463	1.596	1.66
Sept.	1.510	1.940	2.076	2.233	2.356	1.372	1.733	1.825	2.022	2.145	$1.130	1.407	1.480	1.612	1.69
Oct.	1.526	1.943	2.083	2.239	2.391	1.403	1736	.1818	2.038	2.184	1.135	1.392	1.501	1.615	1.70
Nov.	1.549	1.947	2.099	2.257	2.401	1.433	1.751	1.832	2.038	2.174	1.146	1.391	1.514	1.626	1.71
Dec.	1.569	1.973	2.066	2.260	2.413	1.434	1.777	1.859	2.041	2.170	1.157	1.412	1.542	1.636	1.73

* Series revised March, 1948 to cover both public and private contract construction and to include workers engaged in off-site operations for construction as well as site workers.

per week & hours worked

	1952 Earn/wk	1952 Hrs/wk	Apr. 1953 Earn/wk	Apr. 1953 Hrs/wk
All contr const	$87.85	38.7	$88.54	37.2
Building	88.01	38.1	89.42	36.8
General	82.78	38.5	85.65	37.4
Spec trade	91.99	37.7	92.20	36.3
Plumb & heat	94.92	38.9	96.01	38.1
Paint & decor	82.72	35.2	84.87	34.5
Electrical	110.30	40.7	109.48	39.1
Other	88.43	37.0	87.50	35.0
Masonry	81.55	34.7	79.50	31.8
Plaster & lath	90.05	33.6	96.57	33.3
Carpentry	75.90	35.8	75.04	33.5
Roof & sheet-met	76.53	36.1	76.73	34.1
Excav & found	85.81	40.1	83.33	37.2
Non-building	86.72	41.1	84.80	38.9
Highway & street	80.26	41.8	77.62	39.6
Other	91.35	40.6	89.71	38.5

Work injury rates in construction, 1950-51

Bureau of Labor Statistics

	Number estabs reporting	Injury [a] frequency 1950	Injury [a] frequency 1951	1951 Severity [b] rate	Aver days lost [d]	1951 Injuries resulting in Perm total [c] %	Perm partial %	Temp total %
Construction	5,594	41.0	39.3	4.2	104	0.8	3.1	96.1
General contractors	2,719	44.5	42.9	4.5	105	0.7	3.3	96.0
Genl bldg contrs.	1,861	45.4	39.6	2.8	72	0.6	2.2	97.2
Hvy constrn	298	42.8	42.3	4.4	104	1.0	2.5	96.5
Hwy & street	560	44.8	50.8	8.2	162	0.8	6.0	93.2
Spec-trade contr	2,875	33.4	31.5	3.5	103	0.8	2.3	96.9
Plumb, heat, air cond	715	28.5	26.8	1.2	44	0.5	0.5	99.0
Paint & decor	407	23.5	23.5	4.6	194	2.3	1.9	95.8
Electrical	371	26.0	25.7	2.1	81	0.8	2.0	97.2
Masonry	207	39.6	40.7	4.8	118	1.0	2.0	97.0
Plaster & lath	105	44.8	38.2	0.7	18	...	0.2	99.7
Trzo, tile, marble	83	21.5	23.9	....	...	...	...	....
Roof & sheet-met	275	43.1	43.7	4.2	96	0.5	2.0	97.5
Struct steel erect.	61	58.9	48.2	11.8	245	1.9	6.3	91.8
Instal bldg equip	32	25.5	29.6	....	...	...	...	
Misc spec-trade contrs	619	36.8	39.0	3.3	86	0.5	2.5	97.0

•[a] average number of disabling work injuries per million employee-hours worked. •[b] average number of days lost for each 1,000 employee-hours worked •[c] permanent total, including death •[d] charged to each case

Work injuries

Construction	1950	1951	1952 [p]
I All disabilities, Total	205,000	230,000	n.a.
to employees	159,000	185,000	n.a.
II Fatalities, Total	2,300	2,500	2,400
to employees	1,800	2,000	n.a.
III Permanent-total, Total	300	n.a.	
to employees	200	n.a.	n.a.
IV Perm-partial. Total	8,200	8,900†	7,900
to employees	6,400	7,200†	n.a.
V Temporary-total, Total	194,200	218,600	209,700
to employees	150,600	175,800	n.a.

(Based on small sample studies by BLS)

•[p] Prelim. •† Incl. both perm-partial & perm-total disab.

Work injuries were declining in 1952 according to incomplete BLS figures. Total fatalities showed a 9% decrease; permanent-partial disabilities, an 11% decrease; and temporary-total disabilities, a 4% drop over 1951.

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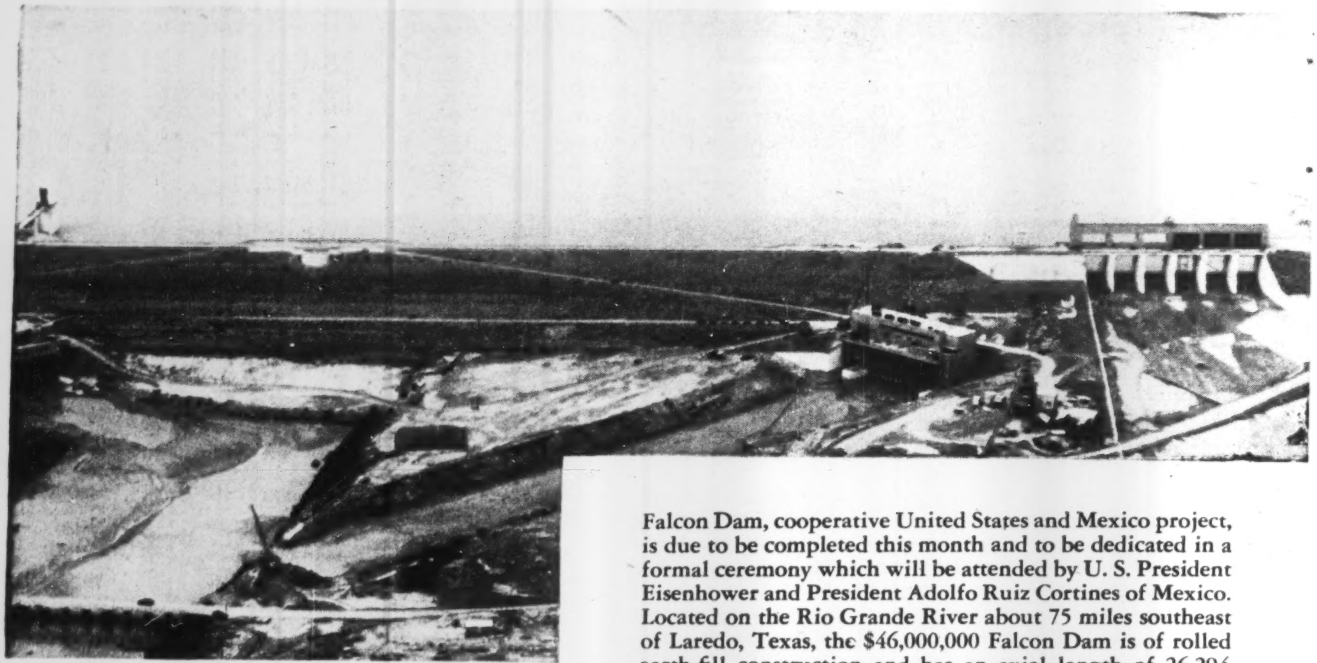
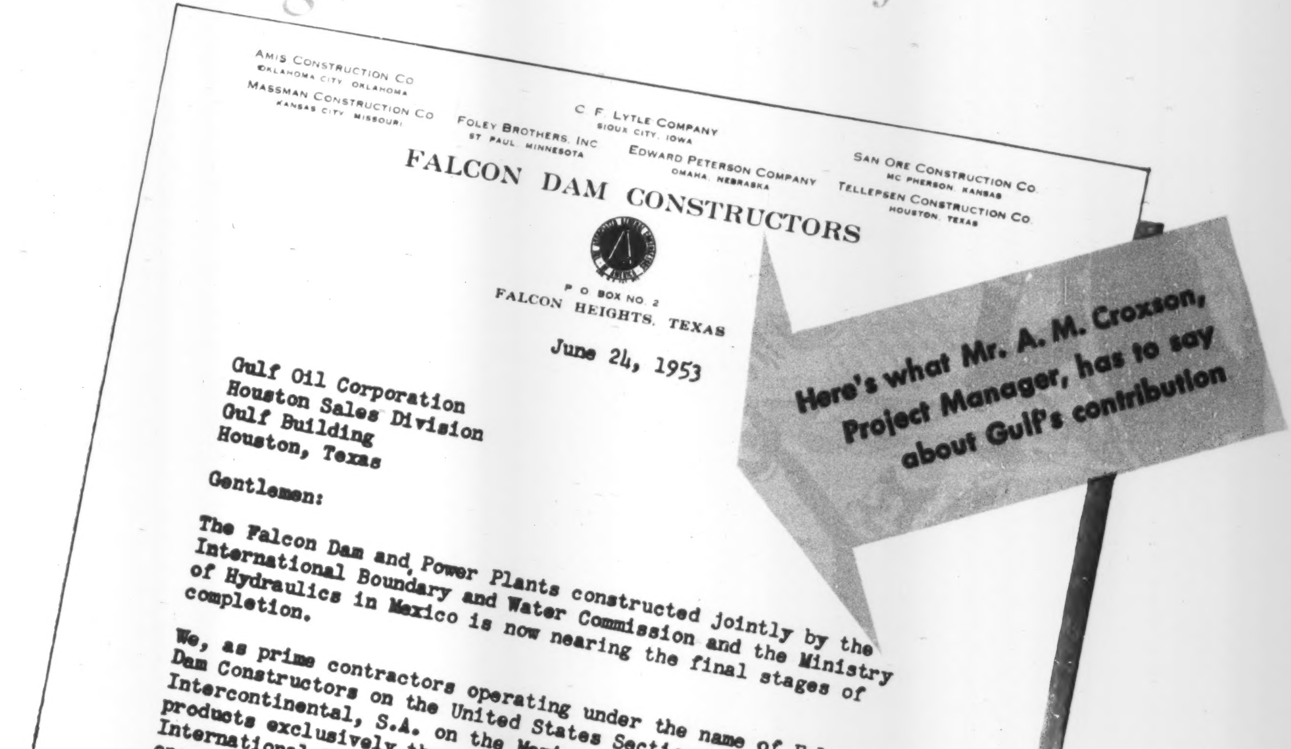


Falcon Dam, cooperative United States and Mexico project, is due to be completed this month and to be dedicated in a formal ceremony which will be attended by U. S. President Eisenhower and President Adolfo Ruiz Cortines of Mexico. Located on the Rio Grande River about 75 miles southeast of Laredo, Texas, the $46,000,000 Falcon Dam is of rolled earth-fill construction and has an axial length of 26,294 feet. The crest of the dam is 35 feet wide, and maximum height above the present river bottom is 150 feet. The major construction item was 29,415,00 cubic yards of earth work. Both the upstream and the downstream sides of the dam are shown in the photographs reproduced here.

keep equipment rolling

on huge Falcon Dam Project


Here's what Mr. A. M. Croxson, Project Manager, has to say about Gulf's contribution

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FALCON DAM CONSTRUCTORS

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FALCON HEIGHTS, TEXAS

June 24, 1953

Gulf Oil Corporation
Houston Sales Division
Gulf Building
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Gentlemen:

The Falcon Dam and Power Plants constructed jointly by the International Boundary and Water Commission and the Ministry of Hydraulics in Mexico is now nearing the final stages of completion.

We, as prime contractors operating under the name of Falcon Dam Constructors on the United States Section, and Constructora Intercontinental, S.A. on the Mexican Section have used Gulf products exclusively throughout the entire construction of this International Dam. We have experienced superior results in the operation and maintenance of our various equipment through the use of Gulf products on explicit recommendation of your engineering staff.

We wish to commend your organization including the engineering and sales staff in affording us uninterrupted service and supply throughout our entire operation. In the event we might be awarded additional work in this area, we would endeavor to resume our present mutual business relations in the use of Gulf fuels and lubricants.

Yours very truly,

FALCON DAM CONSTRUCTORS

A. M. Croxson

A. M. Croxson
Project Manager

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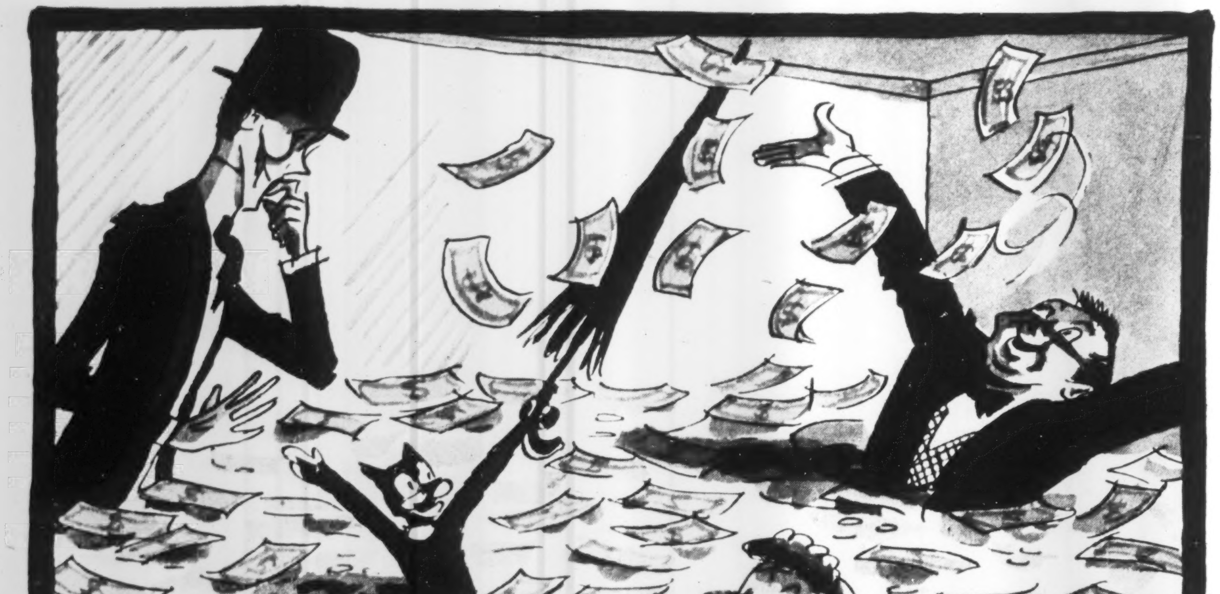
HOW MUCH HAPPINESS CAN MONEY BUY?

(OODLES!) By Mr. Friendly



MONEY . . . I'm just nuts about it,
No ifs, ands or buts about it;
Folding sunshine, good old kale,
Moola, moola, hail oh hail!

Cash and coin and bright mazuma
Put me in the best of humah;
Lettuce, cabbage, long green too . . .
Lucre, velvet . . . I love you!

The point is this . . . if you agree
The sweetest tune is dough re mi!
If every grand seems simply grand
Here's a case you'll understand.

THE $465,912.00 CASE OF THE HEINTZ MFG. CO.

Company: Heintz Manufacturing Company of Philadelphia, one of the most versatile pressed steel manufacturers in the U.S.A.—makers of auto body parts, household appliance assemblies, ship's parts, porcelain finished tubs, plumbing ware, metal television cabinets, jet engine components.

Record: An American Mutual policyholder for 22 years.

Savings through lower premiums: $405,620 in the past 9 years alone.

Savings through dividends: $60,292 in 9 years.

Total savings: $465,912.

Moral: If you're interested in a service that can help reduce costly accidents and premiums to way below average . . . and help raise employee morale, write for the complete case of The Heintz Manufacturing Co., American Mutual Liability Insurance Co., Dept. **0-122**, 142 Berkeley St., Boston 16, Mass.

AMERICAN MUTUAL

Service from salaried representatives in 78 offices!
Savings from regular substantial dividends!

AM

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Base rates on compensation insurance for construction—January 1, 1953

Data Compiled by Herbert L. Jamison & Co., Insurance Advisers and Auditors, New York, N. Y.—(Base rates in effect January 1, 1953—subject to increase or decrease according to experience ratings)

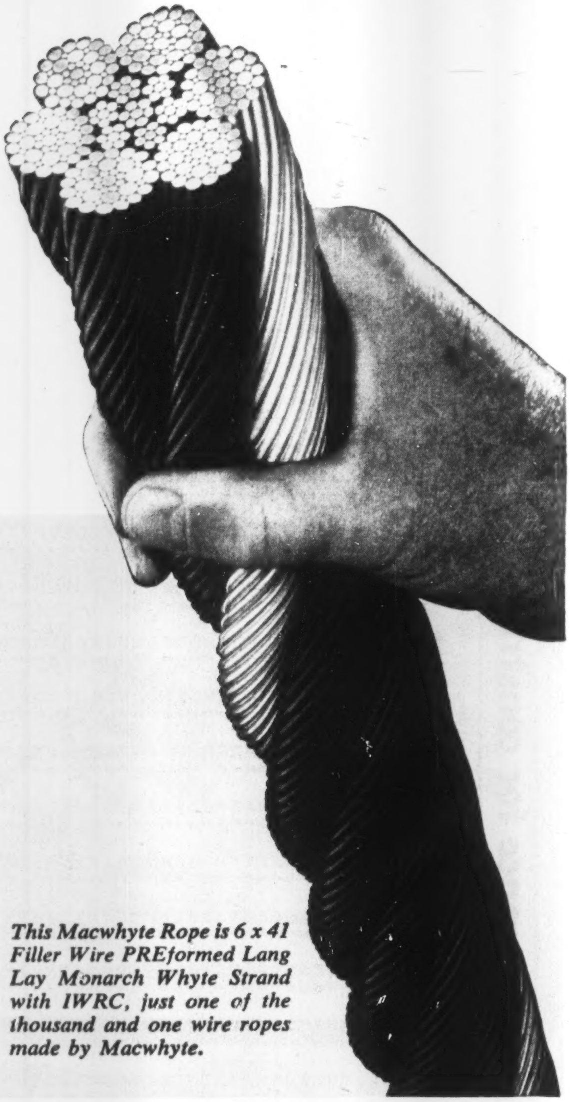
Classification of work	Ala	Alask	Ariz	Ark	Calif	Colo	Conn	Del	D C	Fla	Ga	Idaho	Ill	Ind	Iowa	Kans	Ky	La	Me	Md	Mass	Mich	Minn	Miss	Mo
Carpentry 1-2 family residences	$1.26	$3.47	$4.80	$2.42	$2.66	$1.71	$3.07	$1.50	$2.63	$3.32	$1.42	$3.19	$1.98	$1.73	$1.41	$1.74	$1.73	$3.10	$1.66	$1.89	$3.55	$2.55	$2.57	$3.22	$2.59
Carpentry 3 stories or less	1.26	3.95	4.80	2.98	4.20	1.71	3.07	1.50	2.63	3.32	1.79	3.19	2.42	2.21	2.05	2.09	1.83	3.59	1.67	1.89	4.57	2.55	2.57	4.03	2.59
Carpentry interior trim, cabinet work	.69	2.34	4.80	1.69	4.20	0.85	2.05	1.50	1.93	1.98	1.03	1.57	1.29	0.88	0.88	1.06	1.09	2.16	0.95	1.33	2.17	1.63	3.89	2.04	2.59
Carpentry General	1.87	7.94	4.80	4.14	4.20	2.20	4.88	1.50	2.73	3.32	3.24	5.36	3.61	2.47	2.36	2.89	3.20	5.26	3.29	3.18	8.36	2.55	3.89	5.61	2.59
Chimney construction, brick, concrete	5.17	12.22	9.74	11.91	13.45	6.52	13.43	A	13.21	12.44	6.75	13.33	7.82	6.83	5.86	8.81	9.53	15.93	6.37	9.20	7.59	9.77	10.78	14.32	13.23
Concrete work—bridges, Culverts—C	3.09	A	7.60	5.25	5.50	3.55	6.42	1.40	7.83	4.93	4.64	7.04	3.98	3.52	3.19	3.57	3.80	6.75	4.55	4.89	10.04	3.63	5.73	8.27	4.88
Concrete work—3 stories or less—C	0.72	6.75	3.51	1.55	1.15	1.32	3.30	1.40	3.46	2.78	0.97	2.54	1.58	1.11	1.12	2.04	1.04	2.05	1.81	1.58	5.70	1.46	1.84	2.48	1.85
Concrete work—general—C	1.96	7.14	3.15	2.59	3.09	2.09	5.33	1.40	3.97	3.68	2.10	4.93	2.97	1.46	1.93	3.26	2.67	5.88	1.91	2.78	6.93	2.10	2.88	3.32	4.39
Concrete or cement walks, floors, yards	0.79	2.76	3.51	1.60	A	0.98	2.33	1.30	1.56	2.12	1.30	1.94	1.36	0.89	1.03	1.60	1.16	2.45	1.19	2.14	2.72	1.16	1.48	2.32	2.32
Electric wiring	1.08	1.83	2.59	1.46	1.77	0.96	1.59	0.90	1.87	1.62	1.34	1.77	1.19	1.08	1.00	1.13	1.04	2.02	0.97	1.47	2.04	1.31	1.16	1.77	1.10
Excavation—earth—D	1.46	3.82	3.26	4.40	2.59	2.98	3.81	1.30	3.46	2.68	2.14	5.42	2.15	1.62	1.81	2.93	2.96	2.84	3.21	2.44	4.79	2.22	3.64	3.63	3.14
Excavation—rock—E	2.24	9.09	5.63	5.79	5.66	3.00	8.70	1.95	6.11	6.05	4.13	6.37	4.24	3.14	2.71	3.87	4.00	7.39	3.15	4.58	11.25	4.29	5.39	6.46	6.11
Glazing	1.96	4.33	4.29	4.30	3.62	2.39	5.08	0.85	4.48	3.83	2.75	4.67	2.94	2.34	2.36	3.07	3.19	4.90	2.55	3.39	5.39	3.24	4.21	5.17	3.49
Insulating	0.82	3.50	A	1.88	2.31	1.16	1.86	A	2.36	1.73	0.93	2.63	1.52	1.53	1.26	1.58	1.49	2.82	1.59	1.63	3.80	1.14	2.81	2.77	1.60
Lathing	0.91	3.50	1.89	2.24	1.95	1.12	2.64	0.70	2.08	1.90	1.36	2.14	1.39	1.18	1.14	1.41	1.46	2.82	1.25	1.64	3.20	1.22	1.68	2.70	2.07
Masonry	0.72	5.95	3.26	1.55	2.18	1.32	2.98	0.85	2.05	1.85	0.97	2.54	1.59	0.95	1.12	2.04	1.04	2.05	1.81	1.43	5.70	1.51	1.66	2.48	1.72
Painting and decorating	1.17	4.77	3.41	1.81	3.26	1.76	3.69	1.60	3.24	2.74	1.86	3.63	1.88	1.84	1.36	2.16	2.04	2.22	1.72	2.71	B	1.94	1.90	3.58	2.72
Pile driving—building foundations	4.63	9.10	8.40	11.52	10.80	6.29	5.65	4.20	9.29	7.87	6.72	11.97	6.49	5.47	4.38	8.06	7.58	14.90	3.16	5.56	8.21	5.17	7.76	12.91	10.18
Plastering	0.82	3.50	4.13	1.88	1.95	1.16	1.86	0.70	2.36	1.73	0.93	2.63	1.52	1.39	1.26	1.58	1.49	2.22	1.59	1.63	3.62	1.14	1.81	2.77	1.67
Plumbing	0.84	1.82	2.64	1.45	1.70	1.03	1.76	0.85	1.90	1.50	1.39	1.88	1.41	0.98	1.11	1.30	1.19	2.48	0.95	1.62	2.15	1.26	1.43	2.04	1.57
Roofing	3.37	8.95	5.07	6.33	7.45	3.84	7.32	1.50	5.73	3.81	3.71	8.96	5.72	3.81	5.99	5.23	4.18	4.87	4.71	5.49	17.20	4.34	5.58	5.63	5.88
Sheet metal work	1.24	3.04	3.33	2.72	2.34	1.37	2.21	1.50	2.43	2.36	1.79	2.68	1.71	1.49	1.43	1.62	1.74	2.89	1.46	2.15	2.41	1.33	1.52	3.34	1.85
Steel erection—door and sash	1.29	4.90	2.22	2.79	3.78	1.61	3.72	5.60	3.38	2.59	1.88	3.00	2.15	1.68	1.58	2.02	2.09	4.06	1.77	2.18	4.07	2.27	2.89	3.61	2.89
Steel erection—interior ornament	1.29	4.90	4.28	2.79	8.09	1.61	3.72	2.25	3.38	2.59	1.88	3.00	2.15	1.68	1.58	2.02	2.09	4.06	1.77	2.18	4.07	2.27	2.89	3.61	2.89
Steel erection—structural	5.62	19.60	18.06	11.08	10.29	10.35	15.95	5.60	21.24	12.66	10.31	18.03	8.03	5.32	9.81	11.99	10.71	11.52	8.91	8.66	24.21	17.14	9.68	15.08	11.50
Steel erection—dwellings—2 stories	3.25	10.77	5.43	6.66	8.09	4.02	8.79	5.60	6.96	7.27	4.78	8.40	6.01	3.39	3.77	5.27	5.63	8.39	4.64	5.71	13.33	4.42	7.03	9.13	7.84
Steel erection—general	4.80	11.05	18.06	10.87	8.09	6.74	8.88	5.60	14.50	9.76	7.42	12.77	6.83	4.02	6.34	6.42	5.97	11.52	6.40	6.74	18.29	5.48	8.07	14.86	5.16
Tile work—interior	0.60	1.11	4.28	1.45	1.12	0.73	1.68	0.55	2.09	1.27	0.85	1.34	0.87	0.75	0.76	0.92	0.93	1.47	0.85	1.03	1.92	1.14	1.40	1.74	1.08
Timekeepers and watchmen	1.36	5.95	F	2.63	F	1.64	3.92	F	2.95	3.22	2.00	3.09	2.43	1.72	1.67	2.09	2.06	4.19	1.84	2.37	4.42	2.22	2.99	3.18	3.42
Waterproofing—brush	1.17	4.77	3.41	1.81	3.26	1.76	3.69	1.60	3.24	2.74	1.86	3.63	1.88	1.84	1.36	2.16	2.04	2.22	1.72	2.71	B	1.94	1.90	3.58	2.72
Waterproofing—trowel—interior	0.82	3.50	4.13	1.88	1.95	1.16	1.86	0.70	2.36	1.73	0.93	2.63	1.52	1.39	1.26	1.58	1.49	2.22	1.59	1.63	3.62	1.14	1.81	2.77	1.67
Waterproofing—trowel—exterior	0.72	5.95	3.26	1.55	2.18	1.32	2.98	0.85	2.05	1.85	0.97	2.54	1.59	0.95	1.12	2.04	1.04	2.05	1.81	1.43	5.70	1.51	1.66	2.48	1.72
Waterproofing—pressure gun	1.96	7.14	3.51	2.59	3.09	2.09	5.33	1.40	3.97	3.68	2.10	4.93	2.97	1.46	1.93	3.26	2.67	5.88	1.91	2.78	6.93	2.10	2.88	3.32	4.39
Wrecking	6.95	15.99	28.43	17.19	17.05	9.67	16.35	9.75	16.33	11.94	9.01	18.53	9.62	5.83	9.00	8.52	12.24	17.36	10.30	12.51	24.14	14.14	12.11	20.79	15.20

Classification of work	Mont	Neb	Nev G	N H	N J	N Mex	N Y	N Car	N Dak G	Ohio G	Okla	Oreg	Pa	R I	S Car	S Dak	Tenn	Texas	Utah	Vt	Va	Wash	W Vir G	Wisc	Wyo G
Carpentry 1-2 family residences	$3.16	$2.12	$4.33	$2.14	$3.10	$3.17	$6.85	$1.96	$2.49	$1.82	$3.90	$4.63	$1.40	$3.54	$1.93	$1.22	$1.69	$3.08	$2.24	$1.80	$1.21	$4.08	$1.73	$3.55	$1.97
Carpentry 3 stories or less	3.16	2.18	4.33	2.14	3.30	3.20	6.85	1.96	2.49	2.33	4.90	4.63	1.40	4.75	2.27	1.22	1.76	4.31	2.24	1.80	1.45	4.08	1.83	4.27	1.97
Carpentry interior trim, cabinet work	1.43	1.09	1.96	1.19	1.65	1.53	6.85	1.38	3.76	0.93	3.19	2.14	1.40	3.51	1.46	0.88	1.14	2.37	2.24	0.92	0.85	1.33	1.09	3.55	1.97
Carpentry general	4.88	2.82	6.69	3.05	4.20	5.18	6.85	3.33	3.76	2.60	5.53	5.45	1.40	6.96	5.38	1.42	3.10	4.31	2.24	3.20	2.39	5.40	3.20	4.57	1.97
Chimney construction, brick, concrete	13.65	8.32	18.70	8.68	9.90	11.34	29.43	10.15	10.42	7.20	17.35	A	A	30.21	12.54	4.84	8.09	16.74	10.40	6.42	5.53	A	9.53	14.15	9.15
Concrete work—bridges, culverts—C	6.71	4.30	9.19	5.65	4.40	7.41	8.63	4.29	5.54	3.71	9.50	7.16	1.50	15.76	8.30	3.33	4.17	4.31	5.58	4.04	2.39	6.72	3.80	6.89	4.91
Concrete work—3 stories or less—C	2.35	1.35	3.22	2.51	3.60	1.91	7.95	1.36	1.78	1.17	3.83	4.24	1.50	4.93	1.24	1.08	1.05	4.31	2.50	2.10	0.73	3.98	1.04	2.02	2.20
Concrete work—general—C	4.46	3.35	6.11	4.04	4.40	3.20	7.95	2.94	2.79	1.54	8.54	4.87	1.50	8.90	3.15	2.02	1.91	4.31	2.81	2.24	2.29	4.57	2.67	3.64	2.47
Concrete or cement walks floors, yards	1.81	1.40	2.48	1.48	2.00	1.92	3.83	1.62	1.43	0.94	2.65	2.32	1.65	3.95	1.93	1.05	1.11	2.49	1.65	1.15	0.89	2.04	1.16	2.04	1.45
Electric wiring	1.61	1.18	2.21	1.39	1.35	1.88	4.01	1.36	1.12	1.14	1.96	2.40	0.90	2.46	2.65	0.92	1.29	2.27	1.61	1.01	0.96	2.25	1.04	1.43	1.42
Excavation—earth—D	4.93	2.57	6.75	2.78	3.70	4.61	8.21	2.12	3.52	1.71	6.30	5.43	1.65	8.68	2.51	1.83	2.02	3.71	3.02	2.51	1.33	4.79	2.96	4.07	2.66
Excavation—rock—E	5.65	4.07	7.74	4.31	7.70	5.27	14.74	6.48	5.21	3.31	7.98	A	2.45	13.38	6.20	2.94	5.06	8.32	4.38	3.16	2.97	9.32	4.00	7.17	3.85
Glazing	4.45	3.05	6.10	3.30	4.50	4.21	8.89	3.54	4.07	2.47	6.44	4.90	1.05	10.44	4.68	2.12	3.13	3.22	1.25	2.53	2.25	4.59	3.19	5.19	1.10
Insulating	2.47	1.47	3.38	1.94	1.95	3.00	5.54	1.38	2.72	1.61	4.56	4.16	B	5.18	2.02	1.35	1.08	2.37	3.11	1.48	0.99	3.59	1.49	4.22	2.74
Lathing	2.05	1.46	2.81	1.59	1.95	2.05	3.89	1.70	1.63	1.24	2.49	4.16	0.80	4.84	2.19	1.10	1.53	2.07	1.90	1.21	1.10	3.59	1.46	2.57	1.67
Masonry	2.35	1.35	3.22	2.51	3.60	1.91	6.95	1.36	1.61	1.00	2.31	4.24	1.05	4.93	1.24	1.08	1.05	4.31	1.77	2.10	0.73	3.98	1.04	2.06	1.56
Painting and decorating	3.53	1.93	4.84	3.56	4.80	3.43	7.38	1.75	1.84	1.94	3.63	4.86	2.00	4.76	2.99	1.80	1.55	2.00	2.29	1.82	1.25	4.56	2.04	2.98	2.02
Pie driving—building foundations	11.61	6.89	15.91	4.33	6.60	11.07	12.85	9.69	7.50	5.77	16.85	11.58	3.15	10.93	8.51	5.73	8.19	14.89	6.11	3.30	5.80	10.36	7.58	13.09	5.38
Plastering	2.47	1.47	3.38	1.94	1.95	3.00	5.39	1.38	1.75	1.47	2.89	4.16	0.80	5.18	2.02	1.35	1.08	2.37	3.11	1.48	0.99	3.59	1.49	2.19	2.74
Plumbing	1.70	1.28	2.33	1.73	2.20	1.94	3.99	1.34	1.38	1.03	2.60	2.12	0.85	2.63	1.49	0.99	0.98	2.23	1.31	1.16	0.81	1.99	1.19	2.15	1.15
Roofing	8.59	7.41	11.77	7.07	8.50	9.73	B	5.41	5.40	4.02	13.97	11.35	1.95	13.14	5.82	4.07	3.18	7.18	6.08	4.84	3.72	B	4.18	10.90	5.35
Sheet metal work	2.47	1.78	3.38	1.91	2.40	2.48	5.48	1.68	1.47	1.57	3.36	4.67	1.95	6.45	2.18	1.33	2.14	3.11	2.04	1.51	1.61	4.08	1.74	2.89	1.80
Steel erection—door and sash	2.87	2.06	3.93	2.23	3.30	2.87	5.33	2.39	2.80	1.77	4.60	2.58	4.30	6.81	2.80	1.53	2.14	3.20	1.88	1.71	1.53	A	2.09	3.81	1.65
Steel erection—interior ornament	2.87	2.06	3.93	2.23	3.30	2.87	5.33	2.39	2.80	1.77	4.60	4.32	2.50	6.81	2.80	1.53	2.14	3.20	1.88	1.71	1.53	4.06	2.09	3.55	1.65
Steel erection—structural	18.03	9.84	24.70	10.22	15.60	16.86	27.82	10.66	9.36	5.61	14.21	18.48	4.30	36.43	15.65	7.41	6.76	14.88	7.72	9.24	6.84	17.33	10.71	11.47	7.72
Steel erection—dwellings—2 stories	8.11	5.13	11.11	5.47	6.10	7.69	7.02	6.06	6.80	3.57	12.44	8.87	4.30	16.43	8.48	3.16	5.26	14.88	6.22	4.56	3.80	8.46	5.63	6.20	5.47
Steel erection—general	12.37	7.51	16.95	8.77	8.10	10.57	17.47	9.75	7.80	4.24	10.80	A	4.30	27.46	12.47	5.24	5.70	9.65	7.72	6.62	4.55	11.53	5.97	9.99	6.79
Tile work—interior	1.21	0.96	1.66	1.05	1.60	1.35	4.24	0.97	1.25	0.79	2.50	1.53	0.65	2.99	1.35	0.77	1.03	1.24	2.12	0.84	0.74	1.44	0.93	1.21	1.87
Timekeepers and watchmen	2.87	2.11	3.93	2.28	A	2.90	6.40	2.40	2.89	1.81	3.61	3.97	F	6.92	2.65	1.65	2.20	F	2.49	1.77	1.64	4.16	2.06	4.22	2.19
Waterproofing—brush	3.53	1.93	4.84	3.56	4.80	3.43	7.38	1.75	1.84	1.94	3.63	4.86	1.05	4.76	2.99	1.80	1.55	2.00	2.29	1.82	1.25	4.56	2.04	2.98	2.02
Waterproofing—trowel—interior	2.47	1.47	3.38	1.94	1.95	3.00	5.39	1.38	1.75	1.47	2.89	4.16	1.05	5.18	2.02	1.35	1.08	2.37	3.11	1.48	0.99	3.59	1.49	2.19	2.74
Waterproofing—trowel—exterior	2.35	1.35	3.22	2.51	3.60	1.91	6.95	1.36	1.61	1.00	2.31	4.34	1.05	4.93	1.24	1.08	1.05	4.31	1.77	2.10	0.73	3.98	1.04	2.06	1.56
Waterproofing—pressure gun	4.46	3.35	6.11	4.04	4.40	3.20	7.95	2.94	2.79	1.54	8.54	4.87	1.05	8.90	3.15	2.02	1.91	4.31	2.81	2.24	2.29	4.57	2.67	3.64	2.47
Wrecking	17.85	12.30	24.45	13.17	21.10	17.01	A	11.65	11.71	6.15	19.35	23.61	10.00	35.66	18.09	8.68	10.73	12.77	23.47	10.14	6.77	22.14	12.24	16.30	20.65

*A Specially rated—refer to company. *B Rate varies with type of work. *C Includes form work. *D Pile driving, caisson and dam work separately rated. *E Special occupational disease loadings apply. *F Assigned to main classification.

*G Subscription to State Fund mandatory—Nevada, Industrial Comn., Carson City, Nev.; Workmen's Compensation Bureau, Bismarck, N. Dak.; The Industrial Commission of Ohio, Columbus, Ohio; State Compensation Commission, Charleston, W. Va.; Workmen's Compensation Dept., State Treasurer's Office, Cheyenne, Wyo.

Why "breathing space" between each wire?



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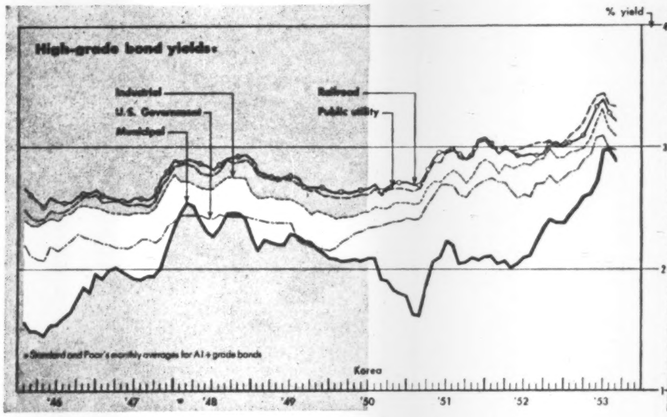
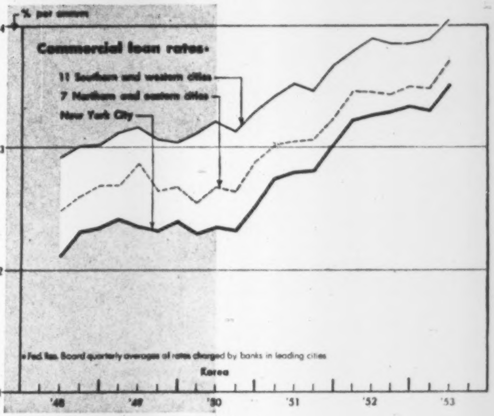




Bond yields may level off in coming months

Financing costs are another important part of overall construction costs, and the way this cost item has been moving up in the past couple of years has taken a bigger bite out of total funds needed to put a project under construction. Ever since the Federal Reserve Board stopped supporting government bonds at fixed prices in the spring of 1951, letting prices fall to their natural market levels, it's been getting steadily more expensive to borrow money (charts).

Government bonds call the tune for the whole capital market, since they are the highest-grade securities which investors can buy. When prices of bonds decline, bond yields rise. Other borrowers have to pay more, too, because they must compete with the rate the Treasury pays on its securities.

However, the outlook for the next few months is for money to get a little easier to borrow than it has in recent months, or at least to go no higher. You can see that this trend has already shown up since mid-1953 in the yields paid on bonds of the various types of long-term borrowers (left-hand chart).

But it hasn't shown up yet in commercial loan rates (right-hand chart). The difference between bond yields and commercial loan rates is simply this: Bond yields are the going rates paid by long-term borrowers. Commercial loan rates are the interest charges paid by short-term borrowers from banks. Most commercial loans run for a 90-day period, though of course they are often renewed. Long-term rates and short-term rates do not necessarily follow the same pattern.

And they may not do so in coming months. For the outlook for commercial loan rates depends on the trend of bank loans to business. Though the usual seasonal rise in business loans has been a little slow in starting this year, it's still too early to tell what may happen. If business loans do not rise much, the banks (who compete fiercely with each other for business) may cut their rates later this year. But if business loans start rising briskly this month and in later months, the banks probably will not lower rates.

The situation in the bond market is different. Financial observers have been impressed by the readiness with which investors absorbed the large volume of corporate and municipal issues offered to it last month (ENR Sept. 24, p. 21). Since this may have been the biggest chunk of financing which the bond market will have to absorb for several months to come, it indicates that investors have changed their minds about the future course of bond yields.

Many of them now believe that bond yields will not go much higher in the next few months, and that perhaps they will be lower. Those who are expecting a recession are confident that bond yields may go lower. For if a recession comes along, there will be less borrowing by corporations. That means there will be fewer corporate bonds available for purchase. Presumably, prices will go up, and yields down.

That may be a good thing for the municipal bond market, where a sizeable volume of financing is indicated through 1953 at least by Engineering News-Record's contract awards and backlog. Municipalities do not necessarily stop construction when a recession comes along; they may speed it up to take advantage of lower construction costs. So a falling-off in corporate issues would make it easier for municipalities to borrow.

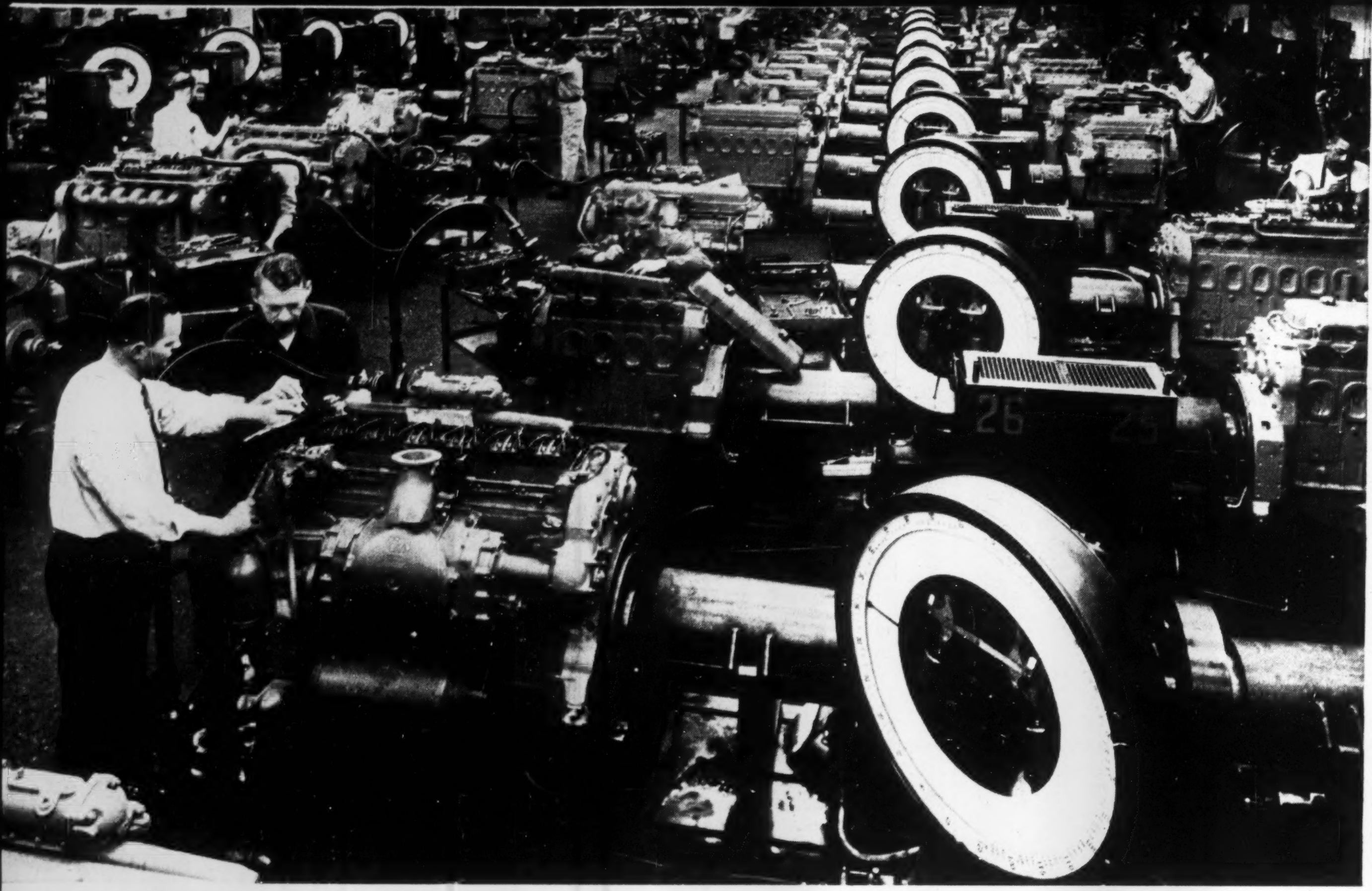
Another point about the municipal bond market is the fact that municipals are tax-exempt. So their attraction depends partly on income tax rates. If personal tax rates are cut, they will become somewhat less attractive to individual investors. However, since it is unlikely that corporate tax rates will be reduced, municipals will still be attractive to corporate investors. So, by and large, it looks now as if local governments will be able to finance a very large volume of construction next year without interest rates going up very much.

Bond yields—per cent

Standard & Poor's

	Govt (1)	U. S.† Treas (2)	Municipal (3)	Industrial (4)	Pub Util (5)	Railroad (6)
1932	....	3.68	4.65	5.58	5.04	5.37
1933	....	3.31	4.71	4.98	4.69	4.54
1934	....	3.12	4.03	4.28	4.19	4.01
1935	....	2.79	3.40	3.73	3.59	3.58
1936	....	2.69	3.07	3.34	3.38	3.31
1937	....	2.74	3.10	3.16	3.22	3.46
1938	....	2.61	2.91	2.82	2.99	3.60
1939	....	2.41	2.76	2.64	2.83	3.39
1940	....	2.26	2.50	2.57	2.75	3.26
1941	....	2.05	2.10	2.50	2.69	3.16
1942	2.27	2.09	2.36	2.54	2.71	3.17
1943	2.29	1.98	2.06	2.55	2.64	3.10
1944	2.38	1.92	1.86	2.58	2.64	3.01
1945	2.34	1.66	1.67	2.50	2.59	2.75
1946	2.19	Disc.	1.64	2.44	2.50	2.59
1947	2.24	....	2.01	2.52	2.59	2.62
1948	2.43	....	2.40	2.70	2.83	2.89
1949	2.28	....	2.21	2.53	2.69	2.71
1950	2.32	....	1.98	2.48	2.63	2.66
1951	2.60	....	2.00	2.72	2.89	2.90
1952	**2.68**	....	**2.19**	**2.87**	**3.01**	**2.98**
J	2.74	....	2.10	2.86	3.00	3.03
F	2.72	....	2.04	2.77	2.98	2.95
M	2.71	....	2.07	2.85	3.00	2.99
A	2.64	....	2.01	2.83	2.97	2.97
M	2.58	....	2.05	2.85	2.98	2.94
J	2.62	....	2.10	2.86	3.00	2.94
J	2.60	....	2.12	2.85	3.02	2.95
A	2.69	....	2.22	2.88	3.03	2.94
S	2.70	....	2.33	2.89	3.03	2.95
O	2.74	....	2.42	2.97	3.06	3.02
N	2.70	....	2.40	2.92	3.00	3.03
D	2.74	....	2.40	2.92	3.03	3.00
1953						
J	2.79	....	2.47	2.95	3.10	3.04
F	2.81	....	2.54	2.97	3.15	3.06
M	2.89	....	2.61	2.99	3.21	3.10
A	2.94	....	2.63	3.07	3.33	3.21
M	3.08	....	2.73	3.21	3.43	3.34
J	3.10	....	2.99	3.32	3.45	3.40
J	2.98	....	2.99	3.16	3.35	3.29
A	2.97	....	2.89	3.09	3.35	3.22

(1) aver. long-term government bonds, taxable. To replace the long-term U. S. Treasury bonds series discontinued after December, 1945.
(2) aver. yield of long-term U. S. Treasury bonds, partially tax exempt, not due or callable for fifteen years. †Federal Reserve Bulletin.
(3) aver. 15 high-grade long-term municipals.
(4) aver. A1 plus industrials.
(5) aver. A1 plus public utilities
(6) aver. A1 plus railroads.



Dynamometer Tests assure that every Diesel engine built by Detroit Diesel Engine Division will deliver its rated power. Every GM Diesel is subjected to several hours of run-in and testing on a dynamometer before it is readied for shipment. In this "basic engine" dynamometer test room, many engines of all sizes may be tested at one time. Other test stands are provided for multiple engine units and for final testing (with accessories) of "package power" units and generator sets.

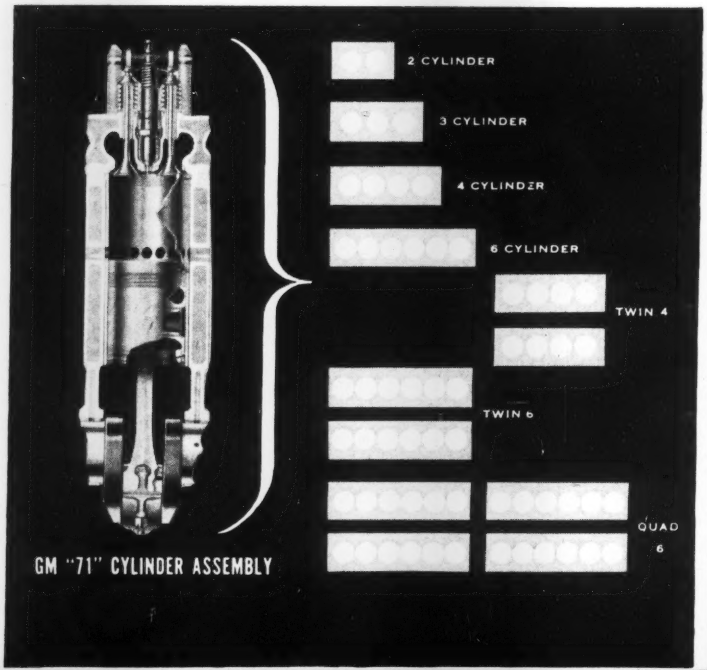
Low-Cost Diesel Performance Begins at Home

A trip through the Detroit Diesel Plant would show you why General Motors Diesel engines have won world-wide recognition for delivering power at the lowest cost per horsepower hour.

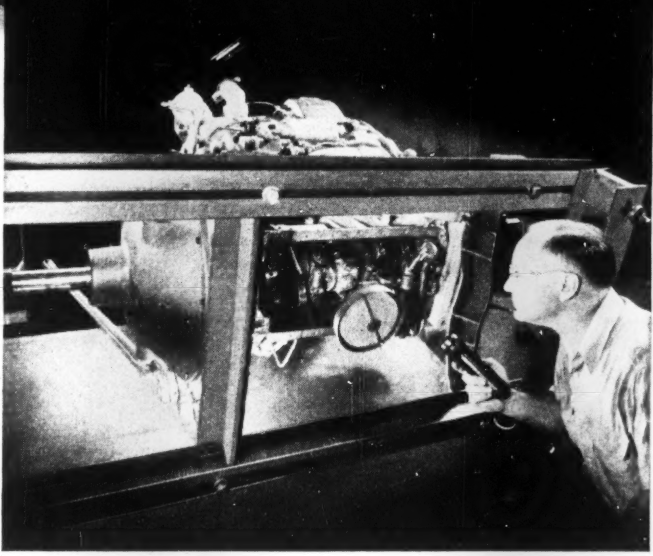
At every step—from our research laboratories straight through to final assembly—you'll see the precautions we take to insure engines of highest quality. You'll see it in the metallurgical tests we give raw materials. You'll see it in the many individual inspections we make on a single engine during assembly. And you'll find it reflected in the performance records of GM Diesel engines in every field.

More than 58,000,000 horsepower in Diesel engines produced by Detroit Diesel since 1937—a record of production unmatched by any other Diesel engine builder—speaks volumes for the dependable, low-cost performance of this modern Diesel power.

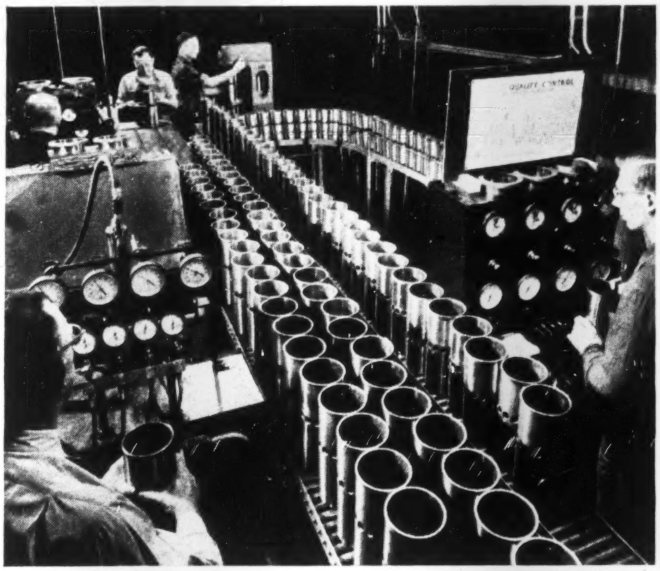
DETROIT DIESEL ENGINE DIVISION
GENERAL MOTORS • DETROIT 28, MICHIGAN



GM "71" CYLINDER ASSEMBLY

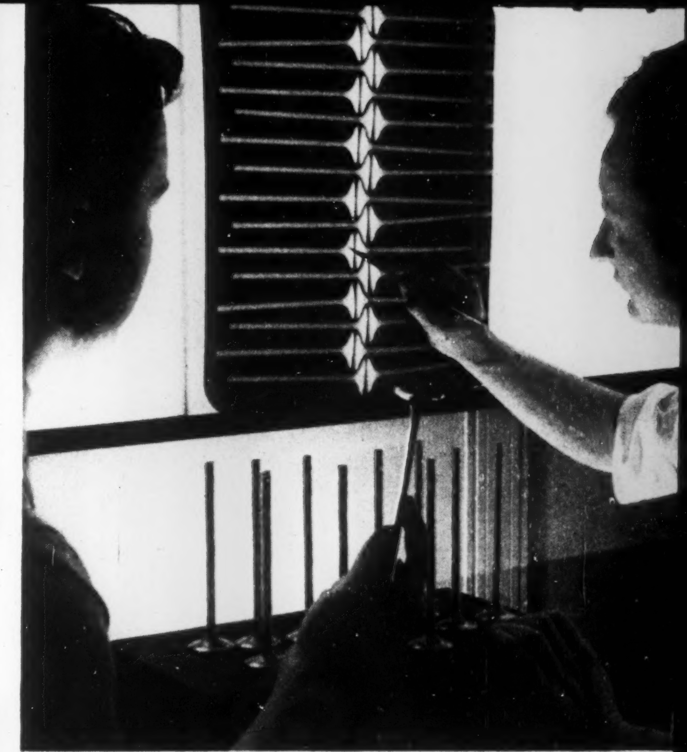


"Bottom" Inspection—After an engine is run in on the dynamometer, it is placed on this tilting rack to turn it on its side for final inspection of the oil pump, crankshaft, connecting rods, bearings, pistons and lower cylinder walls. A GM Diesel is ready for full load operation the minute it is delivered.

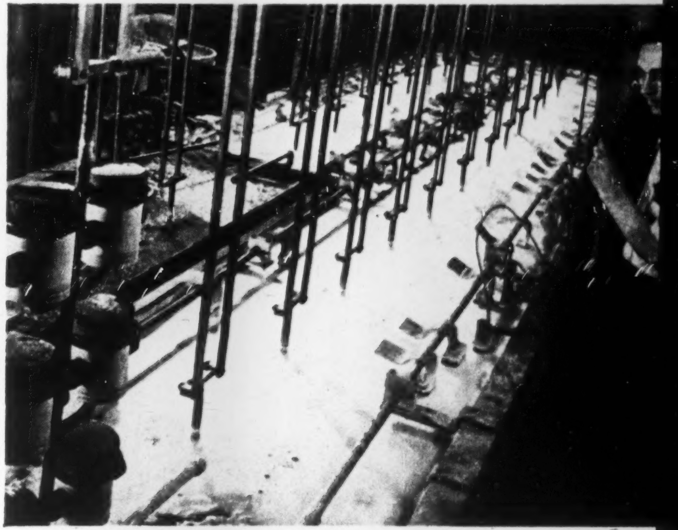


Final Liner Inspection—Pneumatic gauges automatically indicate roundness and inside and outside diameter at several points simultaneously. The extremely close tolerances maintained on all liner dimensions are among reasons why GM Diesel buses average 150,000 to 200,000 miles between engine overhauls.

Real Parts Interchangeability saves money for GM Diesel owners. All of the vital working parts shown at the left (plus many more) fit all GM Series 71 engines from 2- to 24-cylinder models. This unique GM Diesel feature means that an owner of several different "71" engines needs only one small stock of basic parts to service any engine in his fleet, thus cutting equipment down time and reducing inventory investment. Moreover, mass production of standardized parts means that parts are more readily available—*and they cost far less.*



X-Ray Testing—The metallurgical chief and his assistant here inspect an X-ray film of a number of exhaust valves. In our completely equipped metallurgical lab, a 250,000-volt X-ray machine is used to detect any hidden defects in material samples.



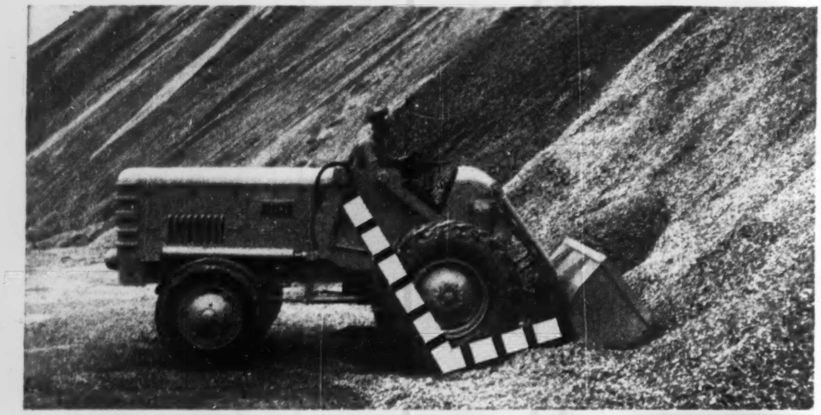
Tin-Plating Pistons—All GM Diesel engine pistons are electrolytically coated with tin plate. This tin coating, which permanently reduces friction between piston and cylinder liner, *stays on for the life of the piston.* Another good reason for standardizing on GM Diesels and *genuine* GM Diesel parts.

It pays to STANDARDIZE on

GM
GENERAL MOTORS
DIESEL
POWER

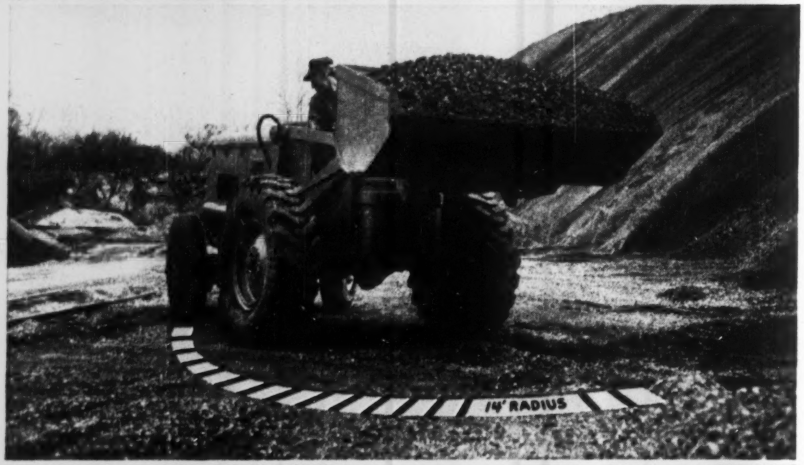
Single Engines . . . 16 to 275 H.P.
Multiple Units . . . Up to 840 H.P.

It's the 1 yd. Jaeger LOAD-PLUS



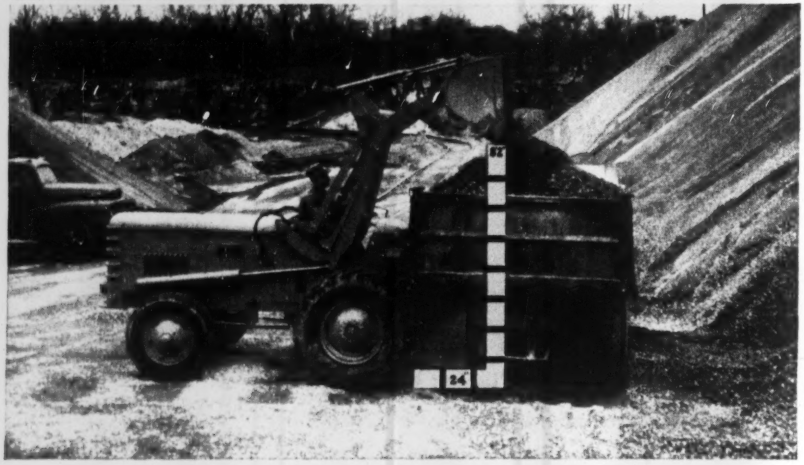
Note how weight of machine and pressure on bucket converge on the driven front wheels. Torque converter drive enables operator to apply any power needed in one fast, smooth build-up, without shifting. It's shock-free, too.

Horizontal thrust of the hoisting pistons crowds the bucket 13″ forward into the pile.



Power-steered rear axle whirls loader in only 14′ radius. 5-speed transmission and instant directional shift take it from there — up to 18.7 mph forward, 28.2 mph reverse.

Engine at rear counterbalances loaded bucket. It's stable.



Longer reach (24″), at higher dumping clearance (8′ 2″ under bucket lip, 10′ 4″ under hinge). Boom arms and bucket under finger-tip control.

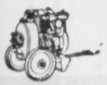
JAEGER
1-Yard Load-Plus

Loader operators take to this machine like ducks to water. *They helped design it.* Catalog L100-3 will tell you why. Send for it today.

THE JAEGER MACHINE COMPANY

200 Dublin Avenue, Columbus 16, Ohio

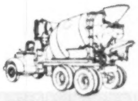
COMPRESSORS



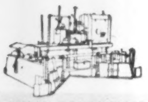
PUMPS

LOADERS

CONCRETE MIXERS



TRUCK MIXERS



PAVING MACHINES

Construction equipment rental rates

Associated Equipment Distributors, Chicago, Ill.

Type of equipment	Per month	Per week	Per day
Air compressors:			
Portable gas 105–160 cf, 100 psi	$231.00	$76.75	$23.75
Portable gas 160–210 cf, 100 psi	323.00	106.00	32.75
Portable diesel, 160–210 cf, 100 psi	390.00	130.00	41.00
Portable diesel, 425–500 cf, 100 psi	759.00	246.00	78.25
Stat. elec. 160–215 cf, 100 psli.	201.00	67.75	21.75
470–570 cf, 100 psi	385.00	120.00	41.25
900–1200 cf, low pressure	482.00	160.00	53.75
Air Tools:			
Clay spades, including scoop	31.50	11.50	3.70
Drifters, medium	77.25	25.00	8.30
Hoists, to 1500 lb single dr	67.25	23.00	7.80
Hoists, 1500–2500 lb dbl dr	105.00	35.50	11.75
Hose, ¾ in per 50 ft length	8.40	3.80	1.70
Paving breakers, 70–95 lb	45.75	16.00	5.00
Rivet hammers	35.00	12.25	4.10
Vibrators, pneu pwr (rigid) 2¾ in. x 17½ in	78.25	24.25	9.15
Wagon drill, with air hoist, medium	215.00	68.50	22.50
Hammers, gasoline	90.00	30.00	9.75
Boilers:			
Vertical, 20–25 hp	134.00	.....	.....
Vertical, 50–60 hp	203.00	.....	.....
Horizontal, 55–70 hp	234.00	56.25	19.00
Horizontal, 90–125 hp	342.00	88.25	28.75
Buckets:			
Clamshell, ⅜ cy	90.75	30.25	9.75
Clamshell, ¾ cy	129.00	43.75	14.00
Clamshell, 1½ cy	194.00	64.00	21.00
Concrete, bottom dump 1 cy	55.50	19.00	6.75
Concrete, bottom dump 2 cy	89.50	27.00	9.10
Dragline, 1 cy	111.00	37.75	12.75
Dragline, 1½ cy	139.00	45.75	15.00
Dragline, 2 cy	162.00	53.50	17.75
Orangepeel, 1¼ cy	228.00	76.75	25.75
Bulldozers—see tractors			
Concrete carts, 6 cf, rubber-tired	17.25	5.90	2.15
9–11 cf, rubber tired	22.50	7.85	2.90
Cranes, cap at ft radius			
Crawler, gas 4¾–7⅞ ton 12	695.00	234.00	79.00
14½–19½ ton 12	1,036.00	352.00	114.00
18½–26 ton 20	2,124.00	670.00	218.00
Crawler, diesel,			
14½–19½ ton 12	1,130.00	385.00	131.00
18½–26 ton 20	2,558.00	833.00	275.00
14½–20 ton 45	3,779.00	1,275.00	421.00
Crawler, steam, 18½–24½ ton 12	1,004.00	335.00	113.00
Locomotive, gas, 27–32 ton 12	1'718.00	578.00	194.00
Locomotive, steam, 27–32 ton 12	1,611.00	544.00	182.00
Truck-mounted, gas 7–9 ton 10	1,066.00	349.00	109.00
12–14½ ton 10	1,379.00	460.00	140.00
Crushers, without acces or power			
Openings 9x16	144.00	49.25	16.00
Openings 10x30	312.00	105.00	33.75
Openings 12x36	457.00	154.00	49.50
Derricks, stiff-leg			
Wood, 3½–4½ ton	137.00	46.75	15.50
Steel, 4–6 ton 50–80′ boom	291.00	106.00	39.50
13–17 ton 70–100′ boom	567.00	214.00	83.50
32–42 ton 70–100′ boom	824.00	314.00	123.00
Guy, 13–17 ton 70–110′ boom	324.00	110.00	37.00
Guy, 35–45 ton 100–120′ boom	619.00	208.00	69.25
Engines:			
Gas with clutch, 22–30 hp	67.00	23.75	8.50
Gas with clutch, 55–70 hp	124.00	44.50	15.50
Diesel with clutch, 22–30 hp	108.00	39.75	15.00
Diesel with clutch, 55–70 hp	202.00	72.75	24.75
Diesel with clutch, 90–115 hp	341.00	120.00	42.25
Finegraders, 11–16′ width, self-powered	1,052.00	339.00	111.00
Finishing machine:			
Concrete-floor, powered	88.25	30.50	9.95
Concrete highway finisher, 9–18′	648.00	221.00	70.75
18–35′	671.00	227.00	77.75
Bituminous machines, self-powered	1,175.00	400.00	127.00
Graders:			
Single drive, 8,500 to 14,000 lb gas	379.00	127.00	40.00
Tandem Dr. 19,000 to 21,000 lb gas	780.00	262.00	85.00
Diesel, 19,000 to 22,000 lb, 41–50 hp	728.00	245.00	78.00
Towed, power operated, 9–11′	264.00	100.00	30.00
Pile hammers:			
Drop, 1,500–2,250 lb	32.25	11.50	3.80
McKiernan-Terry #2	80.75	27.25	8.55
McKiernan-Terry #7	206.00	67.50	21.50
McKiernan-Terry #10B2 or 3	394.00	126.00	41.75
Vulcan #1	387.00	129.00	43.25
Vulcan #00	538.00	181.00	60.25
Vulcan #1800	303.00	105.00	35.00
Tank car heater, 2–3 car capacity	293.00	96.75	32.25
Hoists:			
Gas, single-drum, 29–42 hp	128.00	42.75	14.50
Gas, double-drum, 22–28 hp	131.00	43.75	14.50
Gas, double-drum, 55–65 hp	231.00	75.75	25.00
Elec, single-drum, 17–27 hp	94.75	31.50	10.25
Elec, double-drum, 37–47 hp	188.00	62.75	21.00
Air, 1,500 to 2,500 lb, double drum	105.00	35.50	11.75
Chain, 1½–2½ ton	24.75	9.20	3.55
4½–6½ ton	49.75	15.25	6.15
Mixers, bituminous			
Central plant, 30–50 ton/hr, gradation contr	2,336.00	749.00	241.00
Central plant, 70–90 ton/hr, gradation contr	3,691.00	1,103.00	354.00
Travel plant, 1¼–1¾ ton/hr, self-prop	1,600.00	511.00	160.00
Mixers, concrete			
Power charger, 6½ to 8½ cf.	118.00	40.50	13.50
Power charger, 12 to 16 cf	243.00	83.25	26.25
Batch hopper, 25 to 30 cf.	284.00	96.25	33.00
Paver, 27-E, 1- and 2-drum	1,394.00	453.00	148.00
Paver, 34-E, single drum	1,895.00	629.00	205.00
Pumpcrete, concrete pump, gas			
Mod. 160 single cyl, no remix.	643.00	215.00	67.50
Mod. 200 double cyl, no remix	1,554.00	515.00	172.00
Pumps			
Centrifugal, gas, 2″ 7 to 10 M	54.75	18.75	6.00
4″ 30 to 40 M	106.00	36.25	11.75
8″ 125 M	262.00	86.50	30.50
Diaphragm force or open			
3″ double.	70.25	23.25	7.70
4″ double	83.75	28.50	9.85
Rollers			
2-wheel tand, 5–8 ton gas	381.00	125.00	40.00
2-wheel tand, 12–15 ton gas	503.00	168.00	57.00
3-wheel, 5½–6½ ton gas	285.00	96.50	33.25
3-wheel, 7½–9 ton gas	380.00	123.00	40.00
3-wheel, 11–13 ton gas	548.00	184.00	60.75
Sheepsfoot, double drum	155.00	50.50	16.25
Sheepsfoot, triple drum	236.00	77.25	25.25
Shovels and back hoes, dipper incl			
Crawler, gas ⅜ cy	640.00	214.00	69.25
Crawler, gas ¾ cy	1,044.00	350.00	111.00
Crawler, gas 1¼ cy	1,304.00	435.00	144.00
Crawler, diesel ¾ cy	1,191.00	401.00	128.00
Crawler, diesel 1¼ cy	1,679.00	551.00	179.00
Crawler, diesel 2 cy	2,982.00	988.00	319.00
Surveying instruments			
Levels	34.50	12.25	3.10
Transits	37.50	13.25	3.45
Tractor, crawler, & attachments			
33–41 hp, gasoline	377.00	121.00	43.00
66–85 hp, gasoline	601.00	200.00	67.25
46–52 hp, diesel	557.00	188.00	62.75
72–89 hp, diesel	890.00	299.00	94.00
Tractor, crowler, & attachments			
115–135 hp, diesel	1,209.00	406.00	123.00
Winch, 33–41 hp	106.00	35.00	11.75
Bulldozer, 66–89 hp tractor	197.00	64.75	21.00
Angledozer, 66–89 hp tractor	218.00	73.50	23.50
Tractors—wheeled			
4-wh, rub tired, dsl 70-100 hp.	755.00	264.00	88.00
4-wh, rub tired, dsl 140–180 hp.	1,225.00	418.00	139.00
2-wh, rub tired, dsl 125–165 hp.	1,352.00	428.00	143.00
2-wh, rub tired, dsl 195–220 hp.	2,156.00	730.00	244.00
Scrapers & wagons (heaped mass)			
Scraper 7–10 cy	402.00	134.00	43.00
Scraper, 17–22 cy	909.00	304.00	98.75
Scraper, 29–37 cy	1,481.00	504.00	167.00
Crawler wagons, bottom dump 9½–12½ cy	414.00	161.00	50.25
12½–20½ cy	697.00	199.00	62.25
Vibrators, gas, flexible shaft			
Up to 1½ hp 18 ft shafting	57.75	19.50	6.30
3½ to 4½ hp 28 ft shafting	90.75	29.75	9.65
Welding machine, wheels or skids			
Gas eng driven, up to 250 amp	93.50	32.00	9.85
Gas eng driven, 350 to 500 amp	154.00	51.75	17.25
60 cycle motor-driven, up to 250 amp	50.00	17.00	5.80
60 cycle motor-driven, 350 to 500 amp	74.25	25.00	8.40

EQUIPMENT RENTAL RATES vary greatly throughout the United States, depending upon local practices and conditions. A compilation of prevailing rental rates (representing as nearly as could be determined an over-all average of rental rates throughout the United States for specified types of equipment) has been made for informational purposes only by the Associated Equipment Distributors, 30 East Cedar St., Chicago, Ill., and is available at $5 per copy. Selected items from the Sixth Edition published in 1953 are reported here.

Construction machinery wholesale prices

Construction equipment prices look higher in relation to other wholesale prices when measured by this 1947-49 base than they are when measured from a 1939 base.

The reason is that other wholesale prices, all commodities, for example, also the average hourly earnings in manufacturers of machinery, increased rapidly during the war when equipment prices were frozen and held at the 1941 level.

After the war, equipment prices never closed the gap, but held about 40 points below the other two series (on the 1939 = 100 base). This gap was still there in 1947-49 when the new base pinned all series together at 100. The commodities gap has closed, but the earnings gap continues.

Construction machinery price index

Bureau of Labor Statistics, U S Department of Labor, 1947-49 = 100

By type of equipment	1947 Jan.	1948 Jan.	1949 Jan.	1950 Jan.	1951 Jan.	1952 Jan.	1953 Jan.	1953 July
Construction machy & equip, all types	86.3	95.8	108.7	108.0	123.1	124.6	126.2	129.6
Power cranes, etc	87.7	95.4	108.3	106.9	123.3	123.6	124.2	129.0
Machinery, tractor mounted	83.2	93.8	108.9	109.7	122.9	127.5	131.3	131.7
Specialized construction machinery	84.2	100.7	106.5	106.1	119.3	119.5	119.3	123.4
Portable air compressors	93.6	98.0	105.4	105.4	124.8	124.8	124.8	124.8
Scrapers and graders	85.9	95.9	110.0	108.4	127.3	128.6	129.6	127.7
Air tools, hand tools	89.6	97.5	106.0	106.8	120.5	120.5	120.5	125.0
Mixers, pavers, etc	89.3	95.6	107.7	105.9	117.9	118.5	117.7	123.3
Tractors, non-farm	84.1	95.0	110.1	110.3	123.9	126.6	131.1	135.9

All types by year and month	1947	1948	1949	1950	1951	1952	1953
Aver	**90.0**	**101.8**	**108.3**	**111.5**	**123.6**	**125.5**	.....
Jan	86.3	95.8	108.7	108.0	123.1	124.6	126.2
Feb	86.9	95.4	108.7	108.0	123.6	125.2	126.2
Mar	87.0	97.3	108.6	108.0	123.6	125.2	127.1
Apr	87.5	97.5	108.5	108.0	123.6	124.9	128.6
May	88.5	97.6	108.3	108.2	123.6	125.5	129.1
June	89.5	99.5	108.3	108.1	123.6	125.4	129.4
July	90.3	101.4	108.3	108.8	123.7	125.4	129.6
Aug	90.9	104.1	108.1	112.6	123.7	125.3	.....
Sept	91.4	106.7	108.1	114.6	123.7	125.8	.....
Oct	92.3	108.0	108.1	115.6	123.6	125.8	.....
Nov	93.7	108.6	108.0	116.2	123.8	126.2	.....
Dec	94.7	108.7	108.1	121.7	124.0	126.3	.....

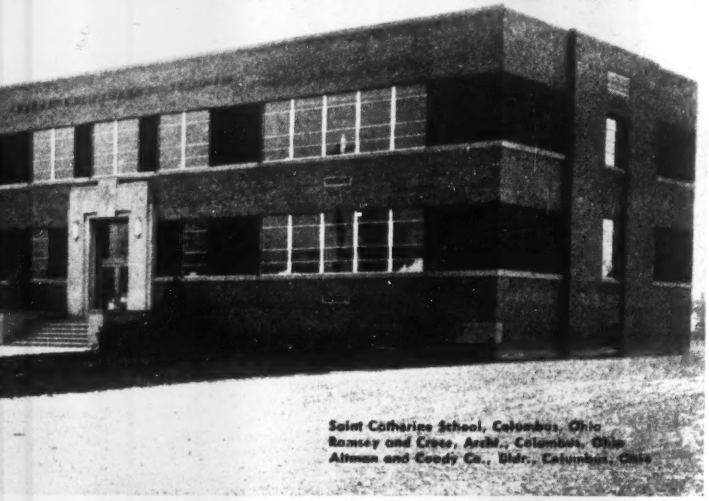
Construction equipment cost index, 1926 = 100

By Marshall & Stevens, Chicago

1913	63.0	**1924**	107.2	**1935**	79.7	**1946**	124.2
1914	59.2	**1925**	105.4	**1936**	83.0	**1947**	150.3
1915	61.2	**1926**	100.0	**1937**	87.2	**1948**	161.1
1916	67.5	**1927**	95.9	**1938**	82.9	**1949**	161.1
1917	88.2	**1928**	96.8	**1939**	82.4	**1950**	166.2
1918	122.6	**1929**	91.0	**1940**	83.4	**1951**	177.3
1919	129.0	**1930**	86.1	**1941**	92.0	**1952**	177.8
1920	154.4	**1931**	77.6	**1942**	100.8	**9/53**	179.6
1921	119.7	**1932**	71.9	**1943**	101.3	....	.....
1922	83.5	**1933**	71.8	**1944**	101.6	....	.....
1923	97.3	**1934**	76.0	**1945**	102.5	....	.....

Where the *other* services also count – it's always

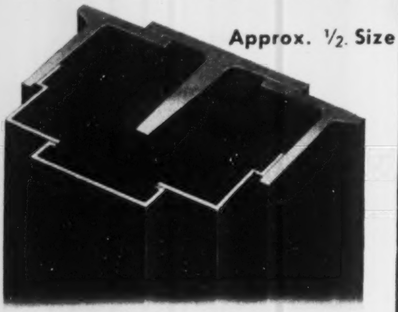
BAYLEY WINDOWS



Saint Catherine School, Columbus, Ohio
Ramsey and Cross, Archt., Columbus, Ohio
Altman and Coady Co., Bldr., Columbus, Ohio

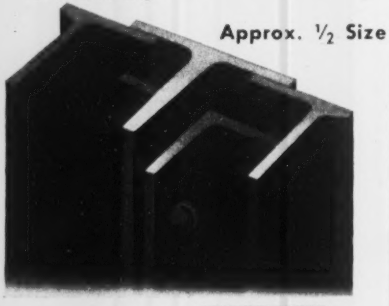
Bayley Originated Variable Width Adjustable Mullion and Mullion Cover

Approx. ½ Size



- Provides for contraction and expansion, insuring good contact at jambs
- Adjustable ½" plus or minus variation in masonry dimension
- Attractively conceals all bolts against corrosion hazard
- Provides two direction slip joint
- Lintel or building load do not bear on window — preventing distortion and assures proper ventilator operation
- Cost-reducing clip and bolt assembly
- Tight window and mullion fit, facilitates caulking

Approx. ½ Size



74 Years of RELIABILITY

Bayley Projected Windows

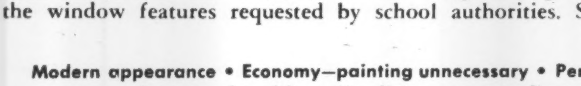
provide the modern school with better ventilation, vision and natural daylighting

The "better-serve" policy that, for so many years, has keynoted Bayley's client relationship is readily apparent in numerous ways. Constant improvement in product detail and quality is one. Another is exemplified in the Bayley Aluminum Projected Window (offered also in steel) that was designed to provide the window features requested by school authorities. Such

Modern appearance • Economy—painting unnecessary • Permanence — long carefree life • Simplicity — no complicated mechanism • Adaptable to all types of construction • Glazing outside — flat surface inside • Easily washed from inside • Prepared for screens • Permits use of accessories, such as draperies, shades, curtains, venetian blinds or awnings.

Whatever your window requirement may be, Bayley's years of specialized window experience can undoubtedly be of value to you. Write or phone.

See Bayley in Sweet's. Complete catalogs on aluminum windows, 16a/Bay; steel windows, 16b/Ba; Saf-T-Gard Hospital Detention Window, 16b/Bay.



THE WILLIAM BAYLEY COMPANY

Springfield, Ohio

District Sales Offices:

Springfield Chicago 2 New York 17 Washington 16

School costs dip in '52 in New York City

New York City school costs dropped in '52, counter to the general rise in building costs across the nation. The Bureau of Construction's economy program and increased competition among contractors accounted for the drop.

The biggest cost savings came in junior high schools. The 7 buildings of this type let in '52 averaged $1.22 per cu ft, down 10% from the $1.36 average for 5 schools in '51. Per pupil costs in '52 averaged $1342, 11% under the $1512 in '51.

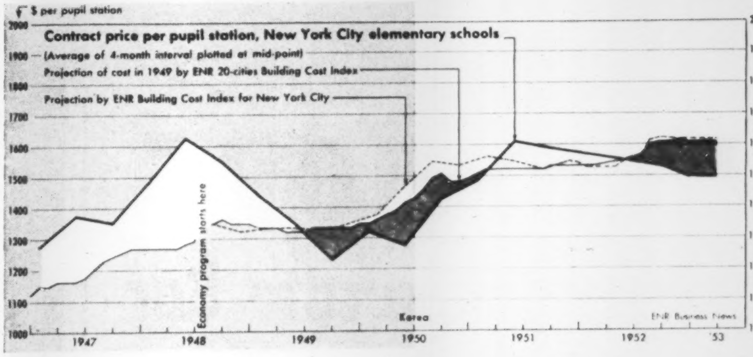
The average cost of $1.32 per cu ft for six 3-story elementary schools in '52 was slightly lower, by 0.8%, than the $1.33 per cu ft for the 10 schools of this type let in '51. But per pupil costs averaged 4% lower in '52 as they dipped to $1417, compared to $1513 in '51.

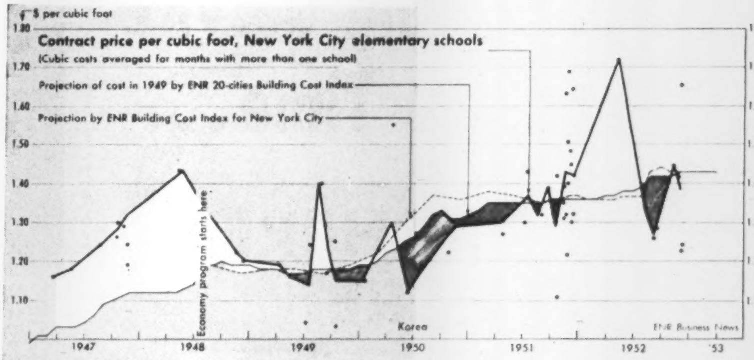
Nearly all of the new schools let in '52 were of concrete construction and all but two had an auditorium and a gymnasium. The one new 3-story elementary school of steel frame construction cost $1.23 per cu ft and $1477 per pupil.

The reduction in school costs occurred in a period of rising materials and labor costs which rose by 4.7% during '52, according to the ENR Building Cost Index for New York City. The same per cent increase was shown by the ENR 20-cities Building Cost Index.

Mr. William Correale, Director of the Bureau of Construction of the Board of Education, expects school costs in '53 to hold to their '52 level, perhaps dip further. This is because the Bureau's economy program was just beginning to bear fruit late in '52. Competition has also helped keep the lid on costs. On the few contracts for school additions let in the first half of '53, bidders numbered as many as 17 on a single job and indicated even stiffer competition this year than in '52 when ten to twelve bidders per job was not unusual.

While building costs are rising slower in '53—the ENR Building Cost Index for New York rose 2.7% in the first 9 months of '53—the increase will make further reductions in school costs in this city problematical.





Based on data from Board of Education, NYC, Office of Coordination of School Construction

Unit prices of schools built in New York City—by years

Elementary schools

		per cu ft			per pupil sta			capacity, pupil stas		
	no	min	aver	max	min	aver	max	min	aver	max
1947...	(9)	$1.16	$1.25	$1.56	$1,255	$1,517	$1,991	558	1,162	1,550
1948	(5)	1.20	1.30	1.43	1,399	1,581	1,784	806	1,094	1,433
1949	(12)	1.03	1.18	1.40	1,148	1,334	1,638	868	1,181	1,588
1950	(11)	1.04	1.20	1.55	957	1,357	1,612	302	1,036	1,581
1951	(24)	1.11	1.39	1.69	1,447	1,710	2,451	358	885	1,274
1952...	(9)	1.23	1.40	1.72	1,391	1,518	1,689	494	969	1,310

Junior high schools

		per cu ft			per pupil sta			capacity, pupil stas		
	no	min	aver	max	min	aver	max	min	aver	max
1947.......	(2)	1.21	1.23	1.25	1,270	1,277	1,284	1,810	2,068	2,326
1948	(1)	1.32	1.32	1.32	1,623	1,623	1,623	1,518	1,518	1,518
1949	(3)	0.99	1.09	1.26	1,261	1,380	1,553	1,518	1,819	1,998
1950	(1)	1.07	1.07	1.07	1,210	1,210	1,210	2,012	2,012	2,012
1951	(5)	1.32	1.36	1.38	1,408	1,511	1,645	1,588	1,842	2,020
1952.......	(7)	1.10	1.22	1.31	1,187	1,342	1,451	1,732	1,813	2,056

School building unit contract prices, New York City—1952

			Min-aver-max COST per		Min-aver-max % of total bldg contract price*			
No.	Size, min-aver-max pupil station	Auditorium gymnasium	pupil station	cubic foot	gen'l constr %	heating %	plumbing %	electrical %
Elementary schools, new 3-story								
1	734	multi-purpose room-lunch, rec. audit	$1621	$1.65	75.5	11.7	5.4	7.4
6	1000-1100-1310	normal size	1391-1471-1535	1.23-1.32-1.45	75.3-76.6-78.1	10.4-11.3-12.2	4.9-5.7-6.5	5.7-6.4-7.0
Elementary schools, new 2-story								
1	494	multi-purpose lunch, recreation	1526	1.72	68.1	14.3	9.1	8.5
1	892	normal	1689	1.29	77.7	11.4	5.3	5.6
Elementary schools, additions								
3	....	audit-gym-classrms.	....	1.35-1.41-1.48	76.6-77.7-79.9	10.4-11.1-11.7	4.6-5.0-5.8	5.1-6.1-7.3
1	....	audit-gym only	....	1.33	79.5	13.2	3.5	3.8
Junior High schools,new 3-story								
7	1732-1813-2056	normal	1187-1342-1451	1.10-1.22-1.31	73.2-75.1-76.7	11.0-12.0-12.6	4.5-4.8-5.3	7.3-8.1-9.0
High school, new 3-story								
1	3041	normal	1663	1.39	72.9	12.4	5.7	9.0
High school additions								
1	1134	cafet.-gym-classrms.	....	1.25	73.4	11.5	6.4	8.7

*Excludes abnormal foundation costs

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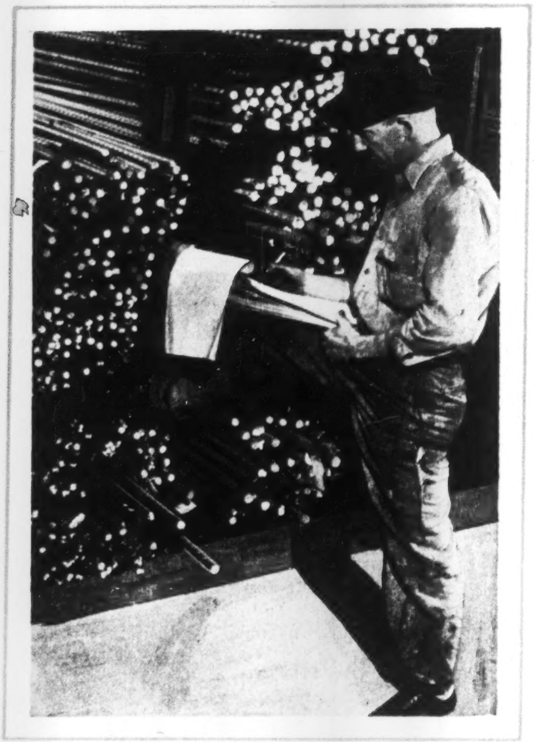

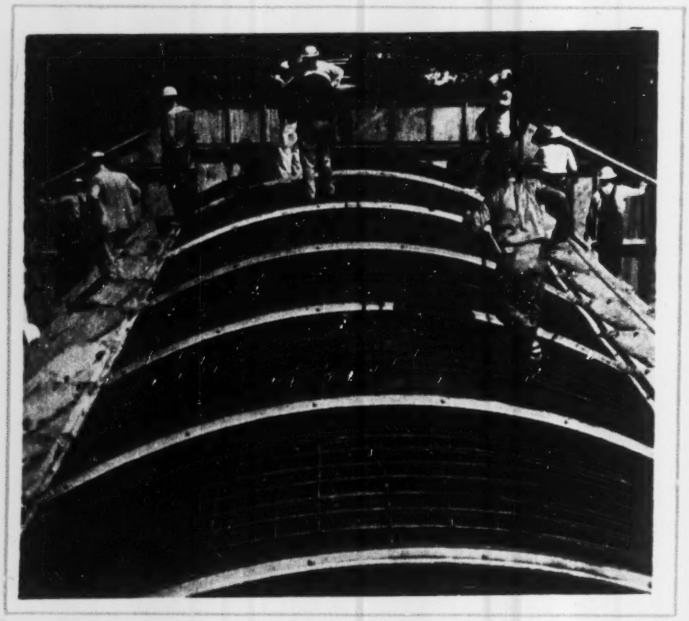

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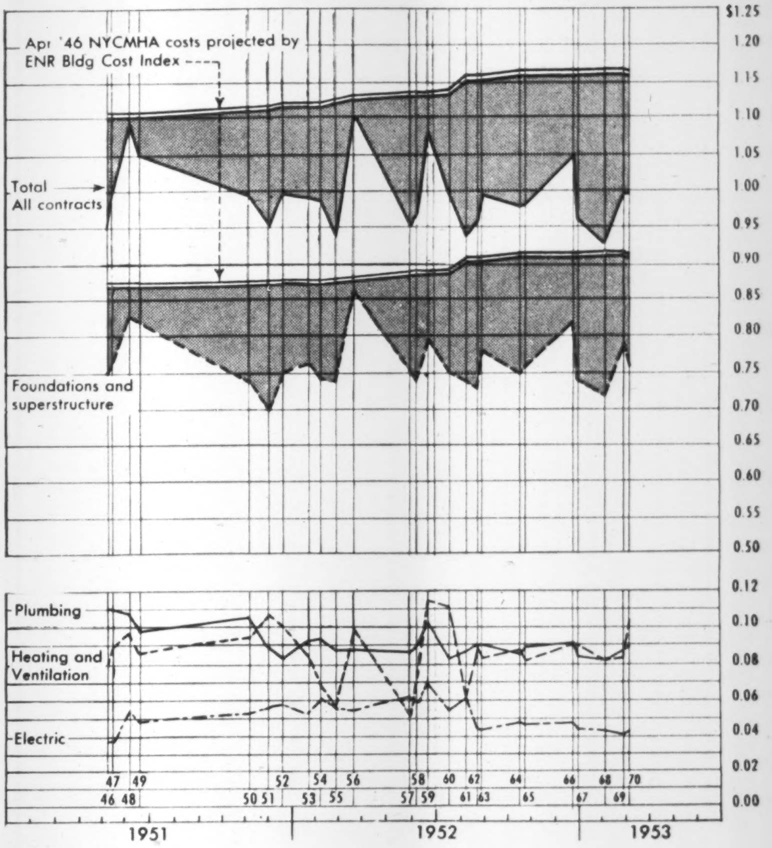
Public housing costs in New York City

Bid prices on contracts awarded by the New York City Municipal Housing Authority showed a slight downward trend in the second half of '52 and first quarter of '53. At the same time bid prices held to a narrow range.

Actual bid prices on 8 projects let in the last six months of '52 ranged from a low of $0.942 per cu ft to a high of $1.045 per cu ft, with six of the projects falling between $0.955 and $0.998 per cu ft. In the first quarter of '53 costs ranged slightly lower for the three projects awarded. The low was $0.927 and the high was $0.998 per cu ft.

The dip in bid prices reflects the increased competition which the New York City Housing Authority noticed early in the second half of '52. Contractors have been able to trim their bid prices in the face of rising materials prices and wage rates. This is shown in the chart at the right by the widening gap between actual bid prices and the trend of April '46 prices projected by the ENR Building Cost Index for New York City. The extension of this cost trend back to April 1946 is shown in the chart in ENR March 29, 1951, page 167.

A sign that the downtrend in housing costs may be at an end came in the bid price of $1.045 per cu ft for section II of the Brevoort Houses which was let recently, but too late to be included in the table or chart on this page. This increase, about 4.5% over the highest cost for projects let in the first quarter of this year, is due primarily to higher wage scales.



NYC Housing Authority Data

All of the projects included in these tables are of reinforced concrete construction with brick exterior walls and tile backup block. Project costs are based on foundations and superstructures, including elevators, heating, ventilation, electric work and plumbing. They do not include architect fees, inspection, piling or abnormal foundations, relocation of existing buildings, site improvements, park developments or appliances.

Contract totals and unit prices on public housing

Awards by New York City Housing Authority

	2nd half 1952								1st quarter 1953		
Project Number	**(60)**	**(61)**	**(62)**	**(63)**	**(64)**	**(65)**	**(66)**	**(67)**	**(68)**	**(69)**	**(70)**
Project	**South Jamaica**	**(St. Nicholas II**	**Soundview**	**Brevoort I**	**Jefferson I**	**Forest I**	**Red Hook II**	**Van Dyke II**	**Cypress Hills**	**Carver I**	**Hammel**
Total constr. rooms .... No.	2,519	2,726	5,233	1,741	1,842	2,690	1,454	2,939	5,886	2,318	2,951
Total apartments .... No.	600	647	1,259	412	469	657	346	719	1,444	564	712
Rooms per apartment .... Aver. No.	4.20	4.21	4.16	4.23	3.93	4.09	4.20	4.09	4.08	4.11	4.14
Total cubage .... Cu. ft.	5,520,777	5,243,071	10,481,330	3,748,186	4,188,699	5,488,600	2,896,000	5,986,884	12,338,237	4,781,928	5,991,153
Bid date	7/15/52	8/5/52	8/22/52	8/26/52	10/15/52	10/21/52	12/23/52	12/30/52	2/3/53	2/25/53	3/3/53
Cost per:											
Total contract	**$5,514,892**	**$4,937,154**	**$10,016,840**	**$3,735,772**	**$4,085,878**	**$5,383,346**	**$3,026,053**	**$5,721,313**	**$11,441,788**	**$4,779,202**	**$5,984,086**
Constr. room	2,189.93	1,811.13	1,914.09	2,145.76	2,218.17	2,001.24	2,081.89	1,946.68	1,943.89	2,061.77	2,027.82
Apartment	9,191.48	7,630.84	7,955.59	9,067.41	8,711.89	8,193.83	8,745.82	7,957.32	7,923.68	8,473,76	8,404.62
Cubic foot	0.998	0.942	0.956	0.997	0.975	0.981	1.045	0.955	0.927	0.999	0.998
Fndns. and superstruct	**4,138,738**	**3,870,755**	**7,698,000**	**2,922,050**	**3,161,503**	**4,188,076**	**2,359,770**	**4,410,303**	**8,893,318**	**3,757,770**	**4,566,850**
Constr. room	1,643.01	1,419.94	1,471.05	1,678.37	1,716.34	1,556.16	1,622.95	1,500.61	1,510.93	1,621.13	1,547.56
Apartment	6,897.89	5,982.62	6,114.38	7,092.35	6,740.94	6,371.50	6,820.14	6,133.94	6,158.80	6,662.71	6,414.12
Cubic foot	0.749	0.738	0.734	0.779	0.754	0.763	0.815	0.736	0.721	0.785	0.762
Heating and ventilation	**613,579**	**313,200**	**933,700**	**310,562**	**366,620**	**450,887**	**262,053**	**540,275**	**1,008,000**	**400,497**	**623,100**
Constr. room	243.58	114.89	178.43	178.38	199.03	167.62	180.23	183.83	171.25	172.77	211.15
Apartment	1,022.63	484.08	741.62	753.79	781.70	686.28	757.38	751.42	698.06	701.10	875.14
Cubic foot	0.111	0.060	0.089	0.083	0.0875	0.082	0.090	0.090	0.082	0.084	0.104
Electrical constr	**300,805**	**319,800**	**467,740**	**164,980**	**202,200**	**257,052**	**140,000**	**268,740**	**526,470**	**197,000**	**258,000**
Constr. room	119.41	117.31	89.38	94.76	109.77	95.56	96.23	91.43	89.44	84.99	87.43
Apartment	501.34	494.28	371.52	400.44	431.13	391.25	404.62	373.76	364.59	349.29	362.35
Cubic foot	0.054	0.061	0.045	0.044	0.048	0.047	0.048	0.044	0.043	0.041	0.043
Plumbing	**461,770**	**433,399**	**917,000**	**338,180**	**355,555**	**489,331**	**264,230**	**501,995**	**1,014,000**	**423,935**	**536,136**
Constr. room	183.31	158.99	175.23	194.24	193.03	181.91	181.73	170.80	172.27	182.89	181.68
Apartment	769.62	669.86	728.36	820.83	758.11	747.79	763.67	698.18	702.21	751.66	753.00
Cubic foot	0.083	0.083	0.087	0.090	0.085	0.089	0.091	0.084	0.082	0.087	0.089
Piling or abnorm. fndns	**176,160**	**43,000**	**624,000**	**46,000**	**650,000**	**137,600**	**300,000**	**30,000**	**200,000**	**450,000**	**230,000**

Where the building dollar goes

From "50 Years of Buildings by Turner" by permission of Turner Construction Co., New York

	Office Buildings								Telephone & Telegraph	Government	Bus Terminal	University			Apartments		Banks		Stores		Breweries		Hospital
												Chapel	Sch Theol	Library									
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
Height, stories	42	32	30	26	25	10	4 & Ph	3 & Ph	20	4	3 & Conc		7		12	11	3 & conc		9		5	7	8 & Ph
Area, sq. ft.	1,087,280	600,000	1,023,400	394,000	575,440	127,028	176,780	196,230	555,500	71,200	668,000	16,510	115,120	313,790	474,200	760,400	32,237	26,100	105,790	154,560	100,107	103,160	330,380
Volume cu. ft.	13,527,990	7,583,000	16,049,000	5,280,000	7,641,970	1,952,780	2,636,200	3,051,590	8,518,000	892,000	12,450,450	398,100	1,524,565	3,939,600	4,790,600	7,478,000	518,995	329,500	1,771,070	2,250,700	1,651,817	1,672,750	4,126,500
Principal items of cost, per cent of total	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Excav, foundns, & site impvs	6.14	4.16	8.20	5.91	4.53	9.67	8.25	4.96	11.78	10.66	8.62	7.72	4.45	8.10	6.71	13.25	9.71	9.64	2.91	14.20	15.59	15.50	5.96
Structural frame	19.52	15.70	18.56	16.32	16.92	17.54	10.87	15.53	15.59	9.85	26.17	8.35	18.28	14.46	18.98	17.68	12.14	16.36	9.50	16.57	23.92	29.23	10.05
Cement finish work	1.38	1.55	0.33	1.67	1.48	1.28	1.15	1.67	1.12	0.67	0.89	0.39	0.83	0.55	0.87	0.83	1.20	1.23	1.03	1.94	0.81	1.90	0.89
Exterior masonry & metal spandrels	3.38	6.20	5.89	7.34	7.69	8.49	9.83	8.33	9.07	22.95	5.80	43.68	16.57	13.85	7.35	6.67	6.92	8.45	9.22	7.59	5.19	7.96	8.44
Interior partitions	6.86	4.49	9.72	4.94	6.95	9.25	6.28	11.27	3.74	2.28	3.96	1.85	5.24	6.32	1.73	1.49	4.16	4.39	3.39	2.69	5.60	5.02	6.63
Carpentry & millwork	1.31	1.59	2.06	1.87	1.26	2.84	0.58	0.80	1.45	1.27	0.11	8.62	3.36	6.18	3.20	4.54	9.83	5.88	4.75	1.29	0.31	0.05	2.17
Sash & glazing scr also screens	3.57	1.96	2.78	1.59	1.03	2.20	1.27	1.75	4.37	4.58	0.35	0.83	8.70	3.81	scr 2.90	scr 2.94	0.56	2.76	2.42	0.68	1.07	1.08	1.70
Roofing, sheet metal, & insul	0.23	0.79	0.62	0.47	0.45	1.24	0.99	0.92	0.51	1.32	0.64	2.39	0.73	2.14	0.62	0.58	1.02	2.98	1.09	1.66	2.24	1.99	1.16
Waterproofing & dampproofing	0.43	0.70	0.61	0.61	0.36	0.13	0.65	0.53	0.53	0.75	0.93	0.13	0.58	0.32	0.60	0.68	0.48		0.31	0.25	0.94	0.54	0.48
Metal lath, furring, & plastering	3.96	3.52	1.45	5.57	2.32	2.17	2.21	2.22	0.95	2.74	1.85	2.58	5.93	3.22	14.03	13.62	2.82	2.31	3.69	3.16	3.58	1.05	3.36
Hollow metal work	0.42	2.15	0.36	1.38	1.34	0.57	0.16	0.19	4.91	2.83	0.30	0.33	2.10	0.34	....	....	0.47	3.00	1.53	0.22	0.71	0.55	2.21
Misc. iron & orn metal	6.93	4.44	3.49	3.68	2.85	1.94	2.09	2.53	2.48	5.51	6.18	1.50	2.71	1.55	1.27	0.71	6.40	4.74	2.54	2.30	1.15	5.87	0.91
Tile, terrazzo, & marble	2.29	3.35	2.77	2.33	2.35	2.59	2.45	2.21	2.41	3.87	3.34	2.60	2.12	1.20	2.18	2.13	2.40	2.08	2.24	2.79	3.59	1.19	1.87
Floor covering	0.75	....	0.63	0.27	0.52	1.27	0.38	0.65	0.73	0.83		0.40	1.10	1.57	4.20	4.16	0.49	0.49	0.73	....	0.80	0.18	1.98
Painting	0.55	0.60	0.52	1.34	0.60	0.48	0.91	0.46	0.92	1.18	0.31	0.70	1.37	0.94	2.41	2.38	0.61	1.18	0.48	0.92	....	1.29	1.89
Finish hardware	0.20	0.77	0.43	0.68	0.27	0.73	0.46	0.44	0.50	0.70	0.13	1.04	0.73	0.39	0.64	0.67	0.34	0.89	0.50	0.36	0.18	0.19	1.42
Acoustical ceilings	0.43	2.07	1.94	1.15	2.45	1.80	2.54	4.23	1.75	0.82	0.68	....	0.23	0.55	....	....	0.70	0.55	....	....	0.90	....	1.32
Vault doors & alarm system	....	....	....	....	0.60	....	....	....	....	....	....	....	....	....	....	....	....	....	[6] 0.79	....	....	....	....
Plumbing sp and sprinklers	4.40	3.30	4.77	4.22	4.91	3.51	3.85	5.02	sp 4.93	3.95	4.60	2.06	sp 5.24	3.04	9.77	8.99	2.92	2.82	3.65	6.65	16.14	3.69	10.39
Heating, ventil, & air condit	16.63	17.65	12.05	16.40	18.55	17.03	20.40	17.45	15.71	14.55	12.10	6.88	9.73	10.43	6.62	6.95	12.90	13.41	15.88	16.80	....	4.33	15.06
Electrical work & light fixtures	10.51	13.75	12.84	14.75	10.28	8.38	18.90	14.25	12.16	6.31	10.50	6.74	5.89	7.92	5.23	5.66	11.05	7.63	10.58	11.83	10.40	16.95	6.66
Elevators, dumbwtrs, & convrs (c,) escalrs (s)	s 8.44	s 10.42	c, s 7.90	c 6.25	c 9.12	c 6.12	2.10	c, s 2.21	3.95	0.93	c, s 5.33		2.51	2.73	4.08	3.59	3.53	4.25	7.09	1.60	2.53	0.33	4.16
Incidental items	0.28	0.35	0.65	0.99	0.24	0.36	0.20	0.46	0.54	1.05	2.28	0.11	0.79	1.98			0.88		0.51	0.70	0.38	1.10	1.00
Doors see footnote	rs,h,rv 0.34	....	....	....	....		kra, ss 0.10	....	....	....	a 1.81	....	....	o, kc 0.22	bkt 1.18	bkt 1.06	v1.45		rv 0.44	0.46	enzk 0.15	....	o, z 0.43
Vertical mail conveyors & pneu tubes	1.05	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Kitchen & refrigeration equip	....	....	1.17	....	1.68	0.28	3.05	1.49	0.79	....	....	....	0.78	....	[3] 4.58	[3] 4.77	1.33	....	....	....	[9] 2.10	....	[11] 5.48
Counter and display cases	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4.96	8.43	....	....	....	....
Sprinkler system	....	0.40	0.26	0.27	....	0.10	0.33	0.43	....	0.18	2.42	....	....	....	....	....	....	....	1.10	2.25	0.97	....	[12] 0.20
Other: see footnotes	....	....	....	....	[1] 1.16	....	....	....	....	....	....	....	....	[2] 8.27	[4] 0.85	[4] 0.54	[5] 5.69	....	[8] 3.81	....	[10] 0.65	....	[13] 4.09

How building costs vary

Average buildings costs, Turner warns, must be used with judgment. How changed conditions alter averages is illustrated in the table at the right. Note that with these few changes, the cubic foot cost that was $1.75 can move downwards to $1.39, or upwards to $1.94. The shape can also change the cost picture. The building used was 50′ x 200′ in plan, 10 stories and basement in height. Changing the shape to 100′ x 100′, 10 stories and basement, still provides the same gross floor area, but reduces the $1.75 cost about 5%, or $0.09 per cu ft.

Typical cost estimate

10-story & basement building containing 1,440,000 cf, costing $1.75/cf

	per cf
Foundations, including piles	$0.09
Structural frame	0.32
Exterior walls (limestone facing)	0.30
Interior partitions	0.17
Stairs	0.01
Floor coverings	0.02
Acoustical treatment	0.07
Roofing, sheet metal, and insulation	0.01
Store front construction, 1st story	0.02
Heating, ventilating, and air conditioning	0.32
Electrical work	0.23
Plumbing	0.08
Elevators	0.10
Miscellaneous	0.01

Adjust cost per cf for unusual conditions: If • foundn on hard rock instead of piles, deduct $0.05 • face brick facade, not limestone, deduct $0.10 • granite facade, not limestone, add $0.17 • air conditioning omitted, deduct $0.15 • underfloor elect duct syst omitted, deduct $0.04 • plaster ceiling, not accoust tile, deduct $0.02 • outside parking facilities provided, add $0.02 (at July, 1952 price levels)

Building costs adjusted to July, 1953, cost index

300 buildings built by Turner Construction Company, New York

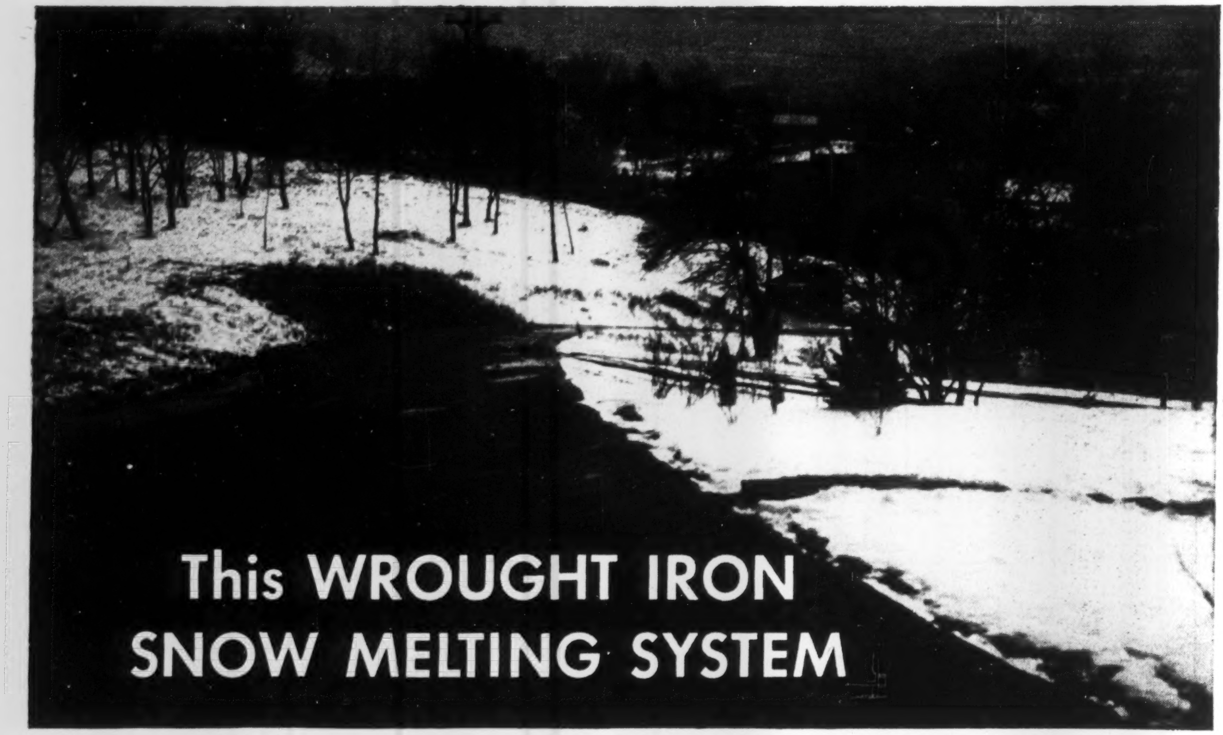
Type—in order of aver cost per sq ft	per sq ft low	aver	high	Type—in order of aver cube cost	per cu ft low	aver	high
1 Lofts	$5.83	$8.43	$12.01	1 Warehouses	$0.24	$0.59	$1.18
2 Apartments	7.36	9.10	11.45	2 Lofts	0.55	0.61	0.92
3 Warehouses	5.42	9.20	16.87	3 Factories	0.25	0.64	1.36
4 Garages	6.39	10.43	16.46	4 Garages	0.63	0.73	1.62
5 Factories	5.01	11.86	18.50	5 Publishing	0.53	0.85	1.03
6 Publishing	7.26	11.86	14.41	6 Apartments	0.75	0.95	1.32
7 Packing houses	9.30	14.21	19.22	7 Public schools	0.90	1.01	1.04
8 Retail stores	9.51	15.33	27.09	8 Retail stores	0.63	1.09	1.92
9 Public schools	12.52	17.89	23.77	9 Brewers & distilrs	0.89	1.23	1.55
10 Private schools	10.99	19.68	29.39	10 Packing houses	0.75	1.34	1.86
11 Brewers & distilrs	14.00	21.06	25.86	11 Athletic buildings	1.00	1.40	1.72
12 Laboratories	14.31	21.47	29.44	12 Laboratories	1.23	1.47	2.41
13 Athetic buildings	18.91	21.72	24.02	13 Private schools	0.80	1.67	2.73
14 Hotels & clubs	14.82	22.49	32.20	14 Office buildings	1.07	1.79	2.61
15 Hospitals	17.89	22.74	30.15	15 Hotels & clubs	1.31	1.82	2.37
16 Office buildings	12.16	23.75	38.33	16 Hospitals	1.51	1.84	2.56
17 Banks	23.00	39.10	51.54	17 Boiler houses	1.76	2.35	2.45
18 Boiler houses	37.31	57.36	78.41	18 Banks	1.74	2.73	3.19

	Industrial Buildings													Warehouses					Research Laboratories					
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
Height, stories	3	2	1		3	2	7 & Ph			4 & Ph	2 & Ph	4	2, 4-story tower	2		2	3	1	13 & Ph	3	2 & Ph	5	3	7
Area, sq ft	527,000	865,350	692,000	768,210	653,000	529,650	381,000	179,800	167,500	179,594	141,700	140,810	43,440	34,492	353,254	203,594	105,155	116,875	145,190	114,290	101,318	73,932	68,525	57,700
Volume, cu ft	24,828,000	18,080,680	16,915,000	16,854,100	12,641,100	12,029,030	5,111,000	5,095,000	3,723,200	3,105,457	2,503,500	2,030,500	415,100	395,930	7,032,053	4,401,934	2,484,738	2,291,747	1,844,950	1,593,800	1,338,110	875,780	837,100	662,520
Principal items of cost	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Excav, foundns & site imps.	13.46	14.42	13.30	17.91	11.07	18.19	13.20	14.50	16.20	20.79	7.31	7.60	8.32	8.89	14.22	27.20	16.13	10.82	9.99	4.64	14.20	17.21	4.05	3.81
Structural frame	21.64	20.53	18.65	17.03	32.35	21.06	36.10	10.30	38.29	35.19	20.66	28.62	22.30	21.82	27.55	32.85	29.22	25.48	15.03	10.46	12.83	30.70	11.60	10.53
Cement finish work	0.22	0.98	0.51	2.75	3.17	2.53	2.45	0.66	1.14	1.91	0.33	3.04	0.83	1.28	4.62	2.81	2.39	0.41	0.83	0.87	1.96	0.90	0.63	0.66
Ext msry & met spandrels	1.72	7.40	1.70	3.91	4.78	4.66	6.52	8.40	10.32	6.06	10.20	7.52	10.25	4.46	2.30	4.69	12.70	5.32	6.53	6.63	14.15	6.63	4.02	5.47
Interior partitions	0.99	2.62	1.73	2.51	3.56	5.49	2.43	0.60	0.76	2.60	8.15	4.48	10.64	4.76	2.61	0.67	1.45	1.39	3.94	18.56	4.95	2.52	6.25	5.09
Carpentry & millwork	0.46	0.96	0.75	0.23	0.51	0.95	0.22	0.07	0.40	....	0.11	2.21	1.93	4.46	0.37	0.21	1.90	2.46	1.75	0.16	0.93	0.15	0.40	2.92
Sash & glazing	1.92	0.57	0.46	1.01	0.88	3.19	2.51	0.04	0.07	1.55	2.06	1.93	3.37	3.73	1.30	0.81	5.41	3.59	1.82	1.27	4.16	1.91	2.84	4.82
Roof, sh met, & insul	1.82	3.28	2.67	3.99	2.50	5.48	1.17	1.87	0.79	1.44	3.99	2.80	3.07	3.32	4.37	1.55	2.67	7.48	1.27	2.10	3.01	0.81	1.23	0.86
Waterp & damp-proofing	....	....	0.63	0.23	0.15	....	0.12	....	0.37	0.29	0.51	....	....	0.93	0.13	0.29	0.76	....	0.28	0.25	0.28	0.62	0.85	0.85
Met lath, fur, & plast	....	....	....	0.93	0.38	0.28	0.54	....	....	3.12	4.13	0.97	4.91	1.77	0.61	....	....	1.54	1.88	....	0.14	0.40	0.96	0.64
Hollow metal work	0.36	0.35	....	0.78	....	0.39	....	....	....	1.32	1.16	0.24	2.79		0.47	0.11	....	....	1.93	0.52	1.01	0.95	2.89	0.56
Misc. iron & orn metal	0.50	1.86	1.49	1.77	4.26	2.24	1.17	2.45	8.15	3.27	5.26	4.06	3.81	6.11	1.82	2.45	3.86	0.34	3.18	2.88	3.85	4.02	2.47	2.70
Tile, terrazzo, & marble	....	....	0.30	0.67	....	0.21	0.30	....	....	0.82	0.39	0.45	1.67	2.31	0.24	....	0.14	0.51	0.67	....	0.88	2.24	3.58	0.48
Floor cov, w wd block	0.39	4.47	2.52	0.28	....	....	0.25	....	....	0.31	....	....	0.85	1.99	0.36	....	w 1.72	....	0.51	1.43	0.51	0.39	0.26	0.32
Painting	0.49	2.04	1.72	1.57	0.37	1.70	2.02	....	1.50	1.09	1.64	1.41	1.69	0.64	1.01	0.27	1.19	1.95	2.01	0.46	0.35	1.66	0.78	1.34
Finish hardware	0.07	0.24	0.09	0.31	0.21	0.10	....	....	0.09	0.20	0.39	0.27	1.03	0.80	0.21	0.06	0.25	0.12	0.69	0.56	0.37	0.31	1.33	0.57
Acoustical ceilings	....	....	0.39	0.68	0.13	....	0.31	....	4.47	....	....	....	0.56	3.73	0.64	....	....	....	....	4.06	0.72	0.79	0.45	0.53
Plumbing	8.58	7.10	6.90	6.01	4.66	6.12	3.97	2.75	4.44	4.44	4.87	11.44	5.91	4.75	4.06	2.59	2.99	4.40	13.21	7.24	{25.55	7.02	4.59	10.63
Heat, vent, & air cond	20.9	13.98	17.45	14.91	6.79	9.90	4.37	6.87	6.17	4.66	8.68	4.85	7.30	9.28	7.94	0.30	3.00	7.90	15.59	22.41		6.00	4.59	18.31
Elect wk & light fixtures	8.30	14.73	22.43	15.04	15.43	8.63	14.60	13.78	0.75	4.19	9.42	8.81	6.17	7.66	7.25	4.08	4.32	7.47	11.19	11.27	8.00	9.55	12.62	8.75
Elev, dumbwrs, & convrs	....	0.97	....	....	3.87	....	5.51	....	0.55	2.21	1.92	2.80	2.26	....	1.98	1.19	2.58	....	4.67	1.79	....	[19] 2.81	0.80	3.61
Incidental items	0.09	0.74	0.97	....	0.10	1.00	0.24	0.52	0.14	0.89	0.18	0.47	0.34	0.66	0.07	0.07	0.23	1.11	0.96	0.78	0.15	0.75	0.54	1.04
Doors	o see HMW	o,kt,rs. 0.38	o,f,sp 0.30	rs, vl 0.34	[15] 1.09	kt,rs 1.23	kt 0.30	km 0.24	o,f,sp 2.21	o,rs 0.75	0.85	kt 0.78	....	kt 0.96	[16] 2.20	rs, m 0.60	[18] 2.41	1.37	....	....	o 0.27		en,o 12.99	....
Sprinkl sys (fp fire protec)	0.14	2.38	2.25	2.65	3.13	3.55	1.70	fp 1.20	2.50	2.90	7.79	3.39	....	3.41	5.90	2.99	2.56	5.67	0.17	0.09	....	1.65	....	0.33
Slabs on ground	1.40	....	2.62	4.49	....	3.10	....	1.80	0.69	....	....	1.86	....	2.28	7.25	....	2.12	10.67	....	....	1.73	....	....	....
Setting of machinery	[14] 35.36	....	[20] 0.17	....	[21] 0.61	....	....	18.50	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Other equipment	....	....	....	....	....	....	....	[23] 15.45	....	....	....	....	....	....	[22] 0.52	[17] 14.21	....	....	1.90	[20] 1.57	....	....	29.28	15.18

•DOOR Types: rs rolling steel •h Herculite •rv revolving •ra rolling aluminum •ss stainless steel •o overhead •f folding •sp soundproof •k Kalamein •t tin clad •m metal clad •c copper clad •vl vertical lift en entrance •rsh rolling shutter •w wood •a aluminum •b hollow metal bucks •v valut •z bronze

•[1] weather signal tower •[2] metal book stacks & library equip •[3] also medicine cabinets •[4] Venetian blinds & misc furniture •[5] safety deposit box & night depository, 0.91%, pedestrian passageway 4.78% •[6] electrical protective system •[7] decorative light fixtures 1.36% [8] industrial equipment, 2.83%; owners special equipment 0.98% •[9] cork insulation & refrigerator doors •[10] spent grain pipin •[11] laundry, sterilizing & laboratory equip •[12] slab on ground •[13] furniture & special equip •[14] casting & foundry eq ip incl install •[15] DOORS kt 0.22%; rs,o 0.87% •[16] DOORS kt 0.29%, rs,wo 1.91% •[17] dredging & dock work •[18] DOORS kt 0.96%, rsh 1.45% •[19] and hydraulic lift •[20] kitchen & refrig •[21] vert unit conveyors & pneumatic tubes [22] floating platforms & loading docks •[23] process piping

Key to Buildings: A 525 William Penn Place Bldg., Pittsburgh, Pa. Indiana limestone and stainless steel in decorative fins, pressed panels, formed window frames, also elevator doors, lobby door handles & trim and in much of equipment for barbe-shop and dispensary. Occupied by U. S. Steel Co. and Mellon National Bank & Trust Co. **B Chrysler Building East, New York, N. Y.** Underground connection to original & companion Chrysler Building and to Grand Central Terminal. Escalators facilitate travel from street to lower level. **C John Hancock Mutual Life Ins. Co., Boston, Mass.** Lantern tower, recreation and dining facilities for employees. Entirely air conditioned. **D The Sinclair Oil Bldg. (Lessee) New York, N. Y.** Owned by Massachusetts Mutual Life Insurance Co. Connects by underground concourse with Rockefeller Center. **E Mutual Life Insurance Co. of N. Y., New York, N. Y.** 13 floors air conditioned. **F Aid Association for Lutherans, Appleton, Wis.** Movable interior walls and partitions, built-in conveyor system for carrying correspondence and other material between floors. Entirely air conditioned. **G Massachusetts Mutual Life Insurance Co., Springfield, Mass.** Two wings added to original building. **H Springfield Fire & Marine Insurance Co., Springfield, Mass.** Fire resistive. Heating & air conditioning equipment housed in separate building connected by 480-ft. tunnel Marble lobby. Employee cafeteria, lounges, & card rooms. **I New England Telephone & Telegraph Co., Boston, Mass.** **J Pan American Union, Washington, D. C.** Marble. **K Port Authority Bus Terminal, New York, N. Y.** Covers full city block, 2 concourse levels, 2 bus loading levels, shops, restaurants, bowling alley, roof parking for private automobiles. **L Boston University Chapel, Boston, Mass.** **M Boston University School of Theology, Boston Mass.** **N Harvey S. Firestone Memorial Library, Princeton, N. J.** Open stacks. **O School Lane House, Philadelphia, Pa.** Twin building, 4-wing crosses, 512 apartment units, 1793 rooms plus 100-ft central lobby serving both bldgs and accommodating shops and other commercial services, 160-car underground garage, terrace garden on garage roof. **P Presidential Apartments, Philadelphia, Pa.** Three buildings (768 apartments, 3-level, 400-car garage, 4-wing crosses) are connected by broad drives with sheltered driveway under each entrance wing. **Q Irving Trust Co., New York, N. Y.** Includes kitchen & 2 small dining rooms. Underground concourse and passage connects to Rockefeller Center. **R The Pennsylvania Co. for Banking & Trusts, Philadelphia, Pa.** Colonial architecture to harmonize with Independence Hall Mall. **S Tiffany & Co., New York, N. Y.** **T Sears, Roebuck & Co., Trenton, N. J.** **U P. Ballantine & Sons, Newark, N. J.** Brew House. **V The F & M Schaefer Brewing Co., Brooklyn, N. Y.** Bottle House. **W Delaware Hospital, Wilmington, Del.** Built in three stages to maintain continuous operation as old hospital was replaced. Provides 344 beds, 57 bassinets. **a Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.** **b Federal Telephone & Radio Corporation, Nutley, N. J.** **c United Aircraft Corporation, North Haven, Conn.** **d The Yale & Towne Manufacturing Co., Philadelphia, Pa.** Provides materials handling equipment for processing 1,200 tons a month. **e Philco Corp., Philadelphia, Pa.** Completely enclosed track docks provide for simultaneous off-street loading and unloading of 28 of largest trailer trucks. Rail sidings, also enclosed, can accommodate 31 cars. Conveyors throughout building and to adjacent buildings on connecting bridges. **f American Can Co., Milwaukee, Wis.** **g Stanley Works, New Britain, Conn.** Reinforced concrete structure designed for line loads of 300 lb sf. Outside bays of cantilever construction. **h United States Gypsum Co., Clark Township, N. J.** Makes paper for production of sheetrock and other gypsum building projects. Includes modern industrial power plant. **i United Aircraft Corporation, East Hartford, Conn.** Massive, windowless, has test chambers capable of simulating varied flight conditions. **j The Coca-Cola Bottling Co. of New York, Inc., New York, N. Y.** Bottling and distribution center, ground and second floors provide for truck storage and loading. Third floor houses production units for washing, rinsing, sterilizing, filling, capping and casing bottles. Offices on top floor and penthouse. Includes roof terrace. **k V. La Rosa & Sons, Inc., Hatboro, Pa.** L-shaped buildings (2) Raw materials arrive by rail, stored in large elevated tanks, conveyors handle material in building. Highest standards of plant sanitation met. **l Colgate-Palmolive Peet Co., Jeffersonville, Ind.** **m The Texas Company, Westville, N. J.** Office building at plant. **n Electrolux Corp., Old Greenwich, Conn.** Recreation building includes gymnasium-theatre, bowling alleys, and lounges. **o F. W. Woolworth Co., Chicago, Ill.** **p News Syndicate Company, Inc., Brooklyn, N. Y.** Waterfront newsprint storage for 750 tons a day, terminal and warehouse. Shipments received by both rail and water. Special conveyors unload and move direct to stroage areas. Truck loading facilities for moving to printing plants. **q Electrolux Corp., Old Greenwich, Conn.** Convertible when desirable, to manufacturing area. **r Alexander Smith, Inc., Chicago, Ill.** **s Sloan-Kettering Institute for Cancer Research, New York, N. Y.** **t Johns-Manville Corporation, Manville, N. J.** Laboratories and pilot plants side by side in two wings. **u Portland Cement Association, Skokie, Ill.** Architectural concrete buildings (2) joined by covered walkway house offices, conference rooms, library, cafeteria, drafting room, storage and processing. **v Colgate-Palmolive Peet Co., Jersey City, N. J.** Research laboratory and pilot plant. **w Socony-Vacuum Oil Company, Inc., Paulsboro, N. J.** **x Massachusetts General Hospital, Boston, Mass.** Research building connected to hospital by corridors.



This WROUGHT IRON SNOW MELTING SYSTEM

changed 700 feet of SKID and SLIDE into a hazard-free surface

Everybody talks about the weather, but the people served by Hillcrest Drive in Coshocton, Ohio did something about it.

Fed up with the hazards and inconveniences encountered each winter on this grade, 14 district property owners went together in 1951 to install a modern street snow melting system. Since then, Hillcrest, a 15 percent slope and formerly one of the town's most dangerous streets, has remained safe and navigable through the worst winter snows.

The system uses three rows of 1½ inch Byers Wrought Iron pipe in each of two tracks which run the entire 700 foot length of the roadway. The pipe, selected for its corrosion resistance, and ability to absorb vibration caused by traffic, was laid directly on the old pavement and covered with two inches of black top. 300 gallons of a 60% water, 40% Prestone mixture are heated by gas-fueled boilers and pumped through the pipe. The system was installed at a surprisingly low cost, and has proven extremely economical in operation. Since installation, the original manual control has been replaced by an automatic electric-eye starting device, and the heating plant enlarged to increase the melting effectiveness.

The Hillcrest Drive snow melting system was designed by C. R. Philips, office manager at James B. Clow Company's Coshocton plant. C. W. Gilmore Plumbing Company, Coshocton, handled the installation, with the welding being done by Reed Welding Company of Coshocton.

Our bulletin, *Wrought Iron Pipe for Snow Melting Systems,* will answer many problems on modern snow removal methods. Send for your copy.

WROUGHT IRON PIPE IS IDEALLY SUITED FOR SNOW MELTING BECAUSE:

Its corrosion resistance has been proven over many years of identical service; it is quickly and easily welded; its heat emission and mechanical strength are high.

Snow melting systems with Byers Wrought Iron pipe currently serve in sidewalks, driveways, loading platforms, service station aprons, roadways.

A.M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Altanta, Chicago, St. Louis, Houston, San Francisco. Export Department: New York, N.Y.

BYERS

CORROSION COSTS YOU MORE THAN WROUGHT IRON

WROUGHT IRON

TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY ALLOY AND STAINLESS STEEL PRODUCTS

Steam power plant costs drop

The average steam power plant going into production in 1952 cost $130-135 per kilowatt capability. This compares with $145-150 in 1950. These averages result from the 8th Steam Station Cost Survey by A. E. Knowlton, Senior Associate Editor, in Electrical World July 13, 1953. Quoted here are the plant investment costs. The original survey includes also operating and maintenance costs. These 1952 plants were largely designed and built between 1948 and 1951, so do not reflect construction costs prevailing in 1952 and 1953.

No simple reasons for this cost reduction in plant investment can be isolated. The kind of fuel burned makes a difference. Outdoor plants usually contribute a saving but they are normally in geographic areas where oil or gas are available as fuel. Since these fuels themselves reduce plant investment, a dual saving results.

Some of the gain is credited to the designers, some to the use of larger generators at lower cost per unit of capability, some to centralization of control, some to adoption of higher steam conditions.

Where fuel costs are low, say 10 cents per million Btu, plant investment of $120 per kw is typical. But where fuel is expensive, say 35 cents per Btu, plant outlay of $135 per kw is invested in high efficiency. The guiding rule is that ⅛ more can be spent for plant refinement to achieve a 4% betterment in fuel consumption. But this must be cross checked against increased carrying charges on investment to determine net saving.

Oil-burning plants cost a bit less than those burning coal. Those burning gas cost less than the oil burners. They range about like this: plants burning coal cost from $100 to $165 per kw, those burning oil range from $145 to $150 and those using gas cost from $90 to $135 per kw.

The higher cost for coal plants is largely due to the facilities provided for coal storage, handling, pulverizing and for avoidance of ash. However, coal plant unit costs come down as megawatt capability goes up. Unit cost drops $55 per kw between a 40-Mw and a 500 or more Mw plant.

The tables on this page are designed to show how size, fuel and design (conventional vs outdoor) affect plant investment as a whole (exclusive of land) compared with investment in structures.

Individual projects are listed with their vital statistics on the tables in the pages which follow.

Steam power plant structures costs

Analysed by type, conventional vs outdoor, by fuel burned, and by size groups.

Structures costs

17 Conventional plants

Capability Mw	0-19	20-39	40-59	60-74	75-99	100-149	150-299	300-499	500 up
Coal	$47.50	$37.98		$50.00			$48.32	$29.60	$24.00
							40.70		
							29.40		
Coal & oil				69.32	$25.00	$21.51	29.11		19.06
							35.75		
							32.00		
Oil			$40.30						
Coal & gas		35.00							
No of plants	1	2	1	2	1	1	6	1	2
Aver cost/kw	$47.50	$36.49	$40.30	$59.66	$25.00	$21.51	$35.88	$29.60	$21.53

23 Outdoor plants, including semi-outdoor

	0-19	20-39	40-59	60-74	75-99	100-149	150-299	300-499	500 up
Coal								$16.42c	
Coal & oil			$29.63			$29.74	31.43C&O		
						32.10			
Oil		$28.20	37.45J						
Coal & gas						23.02			
						28.70 s		22.50	
C, o & g		28.72				39.124			
Gas			22.30	$11.92		17.52		16.33	
						20.64			
Oil & gas		44.77			$23.42	13.87		9.73	
					9.15			15.05	
No of plants		3	3	1	2	8	1	5	
Aver		$33.90	$29.79	$11.92	$16.29	$25.59	$25.59	$16.01	

•J outdoor fans •Is semi-outdoor boiler

Structures and equipment, (land excluded)

17 Conventional plants

Capability Mw	0-19	20-39	40-59	60-74	75-99	100-149	150-299	300-419	500 up
Coal	$164.00	$161.15		$184.00			$118.574	$118.21	$116.00
							143.90		
							127.54		
Coal & oil				202.86	$137.00	$106.05	124.90		100.04
							148.25		
							124.50		
Oil			$146.53						
Coal & gas		147.15							
No of plants	1	2	1	2	1	1	6	1	2
St & eq av	$164.00	$154.15	$146.53	$193.43	$137.00	$108.05	$131.28	$118.21	$108.02
St only av	47.50	36.49	40.30	59.66	25.00	21.51	35.88	29.60	21.53
% St	29%	24%	28%	31%	18%	20%	27%	25%	20%

23 Outdoor plants, including semi-outdoor

	0-19	20-39	40-59	60-74	75-99	100-149	150-299	300-499	500 up
Coal								$100.76	
Coal & oil			$153.38Is			$149.35	$151.04		
						155.30Is			
Oil		$135.58	156.89J						
Coal & gas						161.31			
						146.20s			
C, o & g		150.28				152.146		97.438	
								127.24	
Gas			100.70	$91.40		93.74			
						97.162			
Oil & gas		138.34			$113.12	76.91		117.46	
					75.122			137.53	
No of plants		3	3	1	2	8	1	5	
St & eq av		$141.40	$136.99	$91.40	$94.12	$129.01	$151.04	$116.09	
St only av		33.90	29.79	11.92	16.29	25.59	31.43	16.01	
% St		24%	22%	13%	17%	20%	21%	14%	

Averages compared, conventional plants with outdoor

Structures & equipment

Capability Mw	0-19	20-39	40-59	60-74	75-99	100-149	150-299	300-499	500 up
Conv	$164.00	$154.15	$146.53	$193.43	$137.00	$106.05	$131.28	$118.21	$108.02
OD		141.40	136.99	91.40	94.12	129.01	151.04	116.09	
Saving/kw*		12.75	9.54	102.03	42.88			2.02	

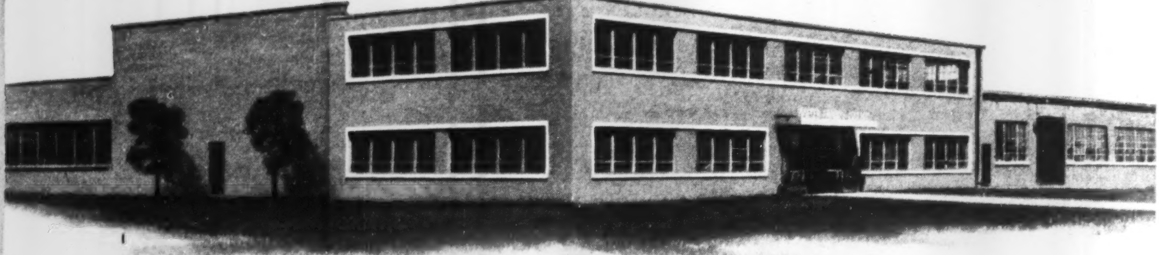
Structures only

	0-19	20-39	40-59	60-74	75-99	100-149	150-299	300-499	500 up
Conv	$47.50	$36.49	$40.30	$59.66	$25.00	$21.51	$35.88	$29.60	$21.53
OD		33.90	29.79	11.92	16.29	25.59	31.43	16.01	
Saving/kw*		2.59	10.51	47.74	8.71		4.45	13.59	

Structures as % of structures and equipment

	0-19	20-39	40-59	60-74	75-99	100-149	150-299	300-499	500 up
Conv	29%	24%	28%	31%	18%	20%	27%	25%	20%
OD		24%	22%	13%	17%	20%	21%	14%	

* This saving in plant investment is affected, too, by type of fuel used so these averages should not be used without adjustment for special conditions of individual plant.



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Steam power plant construction costs, per kw—1

A. E. Knowlton, senior associate editor, Electrical World, 8th Steam Station Cost Survey

Plants use as fuel — Coal

Station Number		191	196 (146)	199	200	201	205	219	221	231	233
Investment Data						Dollars per kw of capability					
Land		$0.08	$0.59	$0.736	$1.10	$0.41	$2.08	....	$2.40	$0.14	....
Structures, improvements		24.00	29.60	48.316	40.70	16.42	29.40	....	50.00	37.98	$47.50
Boiler plant equipment		45.00	47.80	62.143	58.20	44.36	51.10	....	76.80	58.79	54.19
Turbogenerator unit		38.00	31.60	40.618	35.40	32.46	36.76	....	43.00	52.88	47.02
Accessory elec. equipt		7.00	8.25	13.320	7.85	5.34	4.57	....	12.00	10.73	11.13
Misc. plant equipt		2.00	0.83	4.178	1.11	2.18	2.71	....	2.20	0.75	4.15
Total station		**116.00**	**118.80**	**169.310**	**145.00**	**101.17**	**129.62**	**$117.00**	**186.40**	**161.29**	**164.00**
Outdoor switchyard		9.00	7.20	....	10.08	6.58	6.81	....	9.20	14.17	14.58
Total, station and switchyard		**125.00**	**126.00**	**169.310**	**155.08**	**107.75**	**136.43**	....	**195.60**	**175.46**	**178.58**
Building		19.10	....	33.195	....	10.27	22.21	....	38.20	....	47.51
Condensing supply works		5.20	....	9.618	....	4.33	4.10	....	8.60	....	1.18
Fuel handling		9.50	....	12.753	....	6.87	4.43	....	34.60	....	5.01
Ash handling		2.10	....	5.260	....	0.95	0.56	....	2.40	....	2.39
Draft system		5.10	....	6.590	....	6.53	3.11	....	3.20	....	3.24
Feedwater system		4.10	....	5.021	....	3.66	5.16	....	7.10	....	5.52
Piping system		8.30	....	3.952	....	8.89	7.47	....	14.10	....	10.20
Condensers		3.10	....	5.165	....	4.02	2.31	....	6.00	....	7.41
Switchgear, station wiring		6.60	....	9.351	....	4.58	4.55	....	7.30	....	11.13
Station space factors											
Boiler room	cf/kw	12.70	9.20	11.620	16.3	OD	14.97	13.60	16.60	46[3]	24.70
Turbine room	cf/kw	7.00	9.40	7.510	9.4	OD	7.08	9.25	4.10	....	16.50
Switch house	cf/kw	0.40	....	0.670	0.6	0.09	None	....	0.10	....	....
Office, employee areas	cf/kw	0.42	0.63	2.390	2.5	0.21	1.31	0.50	1.20	0.22	0.62
Building, ground area	sf/kw	0.22	0.303	0.272	0.465	0.16	3.25	....	0.27	0.65	0.62
Switchyard	sf/kw	0.24	0.233	0.024	0.9	0.40	0.24	....	0.29	0.54	0.51
Fuel storage area	sf/kw	1.81	0.68	0.954	1.43	1.18	0.60	....	1.61	1.54	....
Coal storage	t/kw	0.93	0.75	1.140	1.175	0.59	0.50	....	0.85	0.58	....
Station details, see footnotes		ABEFM	ABEFm	BEFme	BFm	BDEFm	ABEFm	BH	BEFm	CEFm	CFm
Outdoor		....	Is	....	....	IJK	....	....	....	....	....
Capability rating group	Mw	500 up	300-499	150-299	150-299	300-499	150-299	60-74	60-74	20-39	0-19
Turbogenerators	No	2-5	5	2	2	2	2	1	1	3	1
Boilers	No	6	5	2	2	2	2	1	1	3	1
Steam, pressure	psi	1450	1250-1500	1250	1650	1550-1350	1450	1269	1650[1]	600	650
temperature, initial supht	F	1000	950-1000	950	1000	1000-9550	1000	960	1000	825	825
reheat	F	....	none-1000	....	1000	1000-none	1000	....	1000	....	....
Plant site area	ac	505	228	57	700	900	80	....	60	....	....
in use	ac	505	170	57	69	110	80	....	3.5	....	....
Coal storage cap	M ton	700	225	240	200	100	100	100	60	15[2]	....
Years initial oper & latest unit		51-53	48-52	52-53	52	51-52	50	51	52	49-51	51
Normal function		NQ	Q	Q	Q	N	NPQ	N	N	NQ	N

Plants use as fuel — Coal & Oil

Station number		192	197	202 (62)	203	204	206	207	208	215[7] (137)	218	224
Investment data						Dollars per kw of capability						
Land		$0.12	$0.22	$0.51	$0.41	$0.10	$0.86	$4.16	$0.70	$1.0	$1.81	$6.51
Structures, improvements		19.06	29.11	31.43	35.75	32.00	29.74	21.51	32.10	25.0	69.32	29.63
Boiler plant equipment		44.79	50.42	58.70	64.50	52.80	60.01	37.48	66.30	49.0	74.72	64.64
Turbogenerator unit		29.30	35.86	44.40	34.31	29.90	46.85	26.80	39.90	46.0	42.85	44.04
Accessory elec. equipt		5.97	8.44	13.63	11.85	8.30	11.87	16.04	13.90	15.0	12.13	9.97
Misc. plant equipt		0.92	1.07	2.89	1.84	1.50	0.88	4.22	3.10	2.0	3.85	5.11
Total station		**100.16**	**125.12**	**151.56**	**148.66**	**124.60**	**150.21**	**110.21**	**156.00**	**138.0**	**204.67**	**159.89**
Outdoor switchyard		5.83	6.27	8.22	3.88	8.00	8.45	....	13.20	16.0	16.36	....
Total, station and switchyard		105.99	131.39	159.78	152.54	132.60	158.66	110.21	169.20	154.0	221.03	....
Building		18.21	27.91	....	26.56	24.30	16.09	20.33	24.90	....	52.27	....
Condensing supply works		2.43	4.46	....	6.10	6.60	10.66	....	9.20	....	7.46	....
Fuel handling		5.68	7.24	....	7.36	7.60	13.20	....	11.80	....	23.15	....
Ash handling		1.02	1.48	....	2.97	1.20	3.43	....	2.00	....	6.64	....
Draft system		1.82	....	....	8.22	9.80	3.45	....	5.90	....	3.92	....
Feedwater system		3.47	3.63	....	5.03	5.20	6.19	....	5.60	....	4.78	....
Piping system		7.11	7.77	....	13.87	7.00	13.99	....	7.50	....	8.37	....
Condensers		2.05	....	....	2.70	4.10	3.11	....	4.90	....	5.95	....
Switchgear, station wiring		4.87	6.83	....	11.81	6.40	11.03	....	11.50	....	12.13	....
Station space factors												
Boiler room	cf/kw	11.53	10.96	OD	14.50	17.40	....	20.69	12.23	16.10	28.8	12.43
Turbine room	cf/kw	11.82	11.24	2.611	14.90	10.60	2.57	10.63	10.12	16.30	18.3	7.18
Switch house	cf/kw	....	....	0.22	2.00	....	....	3.53	0.29(.4kv)	....	....	0.085
Office, employee areas	cf/kw	1.55	1.03	0.270	0.65	0.54	1.20	0.15	1.42	0.34	3.5	1.46
Building, ground area	sf/kw	0.228	0.181	0.176	0.41	0.40	1.33	0.52	0.31	0.64	0.46	0.36
Switchyard	sf/kw	0.085	0.055	0.20	0.06	0.40	0.87	0.12	0.17(12kv)	0.95	1.04	0.176
Fuel storage area	sf/kw	1.02	0.62	0.25	1.20	0.90	1.280	0.88	2.83	2.10	8.0	....
Coal storage	t/kw	1.67	0.67	0.78	0.47	0.90	667.5	0.27	1.59	1.05	4.0	1.0
Station details, see footnotes		BGEFm	BGEFm	BEMFm	ABEFm	BFe	BMEFme	BCFe	ABEFm	7A5CFm	BEFe	BEFm
Outdoor		....	....	IJK	....	....	IJK	....	IsJK	....	....	IsJK
Capability rating group	Mw	500 up	150-299	150-299	150-299	150-299	100-149	100-149	100-149	75-99	60-74	40-59
Turbogenerators	No	4	2	3	2	2	2	8	2	7	1	2
Boilers	No	4	2	3	2	2	1	22	2	8	1	2
Steam, pressure	psi	2000	2000	1250	1450[1]	875	1250 & 1450	220 & 850	1300	300 & 850	935	850
temperature, initial supht	F	1050	1050	950	1000	900	950 & 1000	100 & 373	950	679 & 900	950	900
reheat	F	1000	1000	....	1000	....	none-1000	....	....	....	....	900
Plant site area	ac	143	207	1100	27	950	....	18.7	110.64	55	1422	....
in use	ac	143	207	50	27	40	34	9.2	110.64	55	70	....
Coal storage capacity	M ton	1000	200	127	70	130	100	45	220	100	250	50
Oil storage capacity	M bbl	2.4	1.2	....	1.0	125	69	57.5	80.7	0.95	0.140	....
Years, initial oper & latest unit		50-52	51-52	49-52	51	48-51	51-52	16-50	51	28-51	52	50
Normal function		N	N	Q	N	N	NQ	N	N	NP	N	NQ

FOOTNOTES **STATION DETAILS:** •A Car dumper •B pulverizer •C stokers •D controlled circulation •E centralized control •Fm mechanical fly ash collection Fe electronic fly ash collection •G pressurized •H cyclone furnace •I outdoor boiler (semi s) •J outdoor fans (semi s) •K outdoor air heater •L spray pond •M cooling tower **NORMAL FUNCTION** •N Normal system station •O Normal distribution station •P Normal transmission station •Q Normal base load •R Standby •S Power & district steam •[1] throttle •[2] also 3,500 bbl oil •[3] includes bunkers and basement auxiliaries •[4] shaker, car dumper •[5] housed portion and firing aisle •[6] incl. wells, cooling tower, switchyard and water control house.

These steam plant investment costs are selected from the 8th Steam Station Cost Survey by Electrical World which includes operating costs. The full report was in Electrical World, July 13, 1953. Plants are grouped here by type of fuel, which has a marked effect on their cost, as can be noted.

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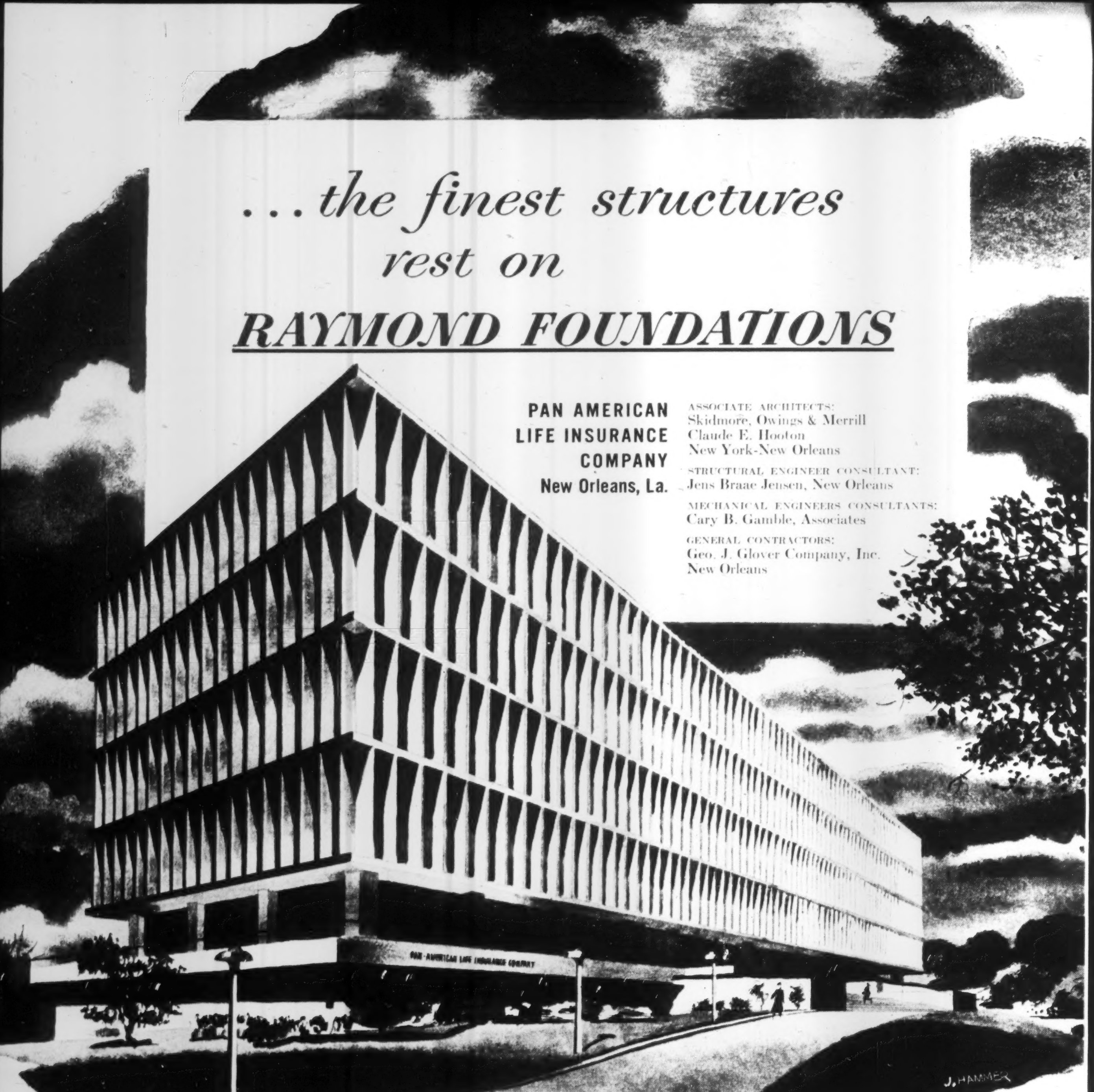

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Steam power plant construction costs per kw—2

Plants use as fuel	Oil			Coal & Gas			Coal, Oil & Gas				
Station number	223	226	227	209	212	232	193 (144)	198	213	229	230
Investment data					Dollars per kw of capability						
Land	$0.47	$3.31	$0.42	$0.73	$0.62	$1.85	$3.17	$0.062	$0.424	...	$0.58
Structures, improvements	40.30	37.45	28.20	23.02	28.70	35.00	22.50	16.33	39.124	...	28.72
Boiler plant equipment	49.20	55.75	48.50	76.14	58.10	52.00	56.80	38.18	62.914	...	66.18
Turbogenerator unit	43.20	49.10	41.74	48.87	49.70	57.00	29.10	37.44	36.791	...	44.59
Accessory elec. equipt	11.65	11.48	13.70	12.71	7.70	...	17.75	4.68	12.881	...	9.64
Misc. Plant	2.06	3.14	3.44	0.57	2.00	3.00	1.09	0.850	0.440	...	1.15
Total station	**147.00**	**160.20**	**136.00**	**162.04**	**146.82**	**149.00**	**130.41**	**97.54**	**152.57**	**$152.50**	**150.86**
Outdoor switchyard	9.00	12.81	11.22	9.29	9.13	...	4.68	4.21	4.83	12.00	...
Total, station and switchyard	156.00	173.01	147.22	171.33	155.95	...	135.09	101.75	157.40	164.50	...
Building	33.10	29.20	10.41	17.27	...	...	17.20	15.00	20.595	...	...
Condensing supply works	9.02	12.95	7.16	5.53	...	...	3.10	3.15	3.056	...	...
Fuel handling	4.03	14.60	9.49	5.24	...	...	10.60	7.30	11.434	...	...
Ash handling	...	0	...	1.80	...	...	4.10	0.86	2.417	...	...
Draft system	7.98	5.42	4.15	7.73	...	...	3.04	4.27	4.338	...	...
Feedwater system	5.12	3.54	5.05	4.77	...	...	5.26	3.29	3.890	...	...
Piping system	12.54	9.60	11.36	10.00	...	...	12.55	5.39	9.321	...	...
Condensers	4.43	5.52	9.10	5.42	...	...	2.59	4.37	4.176	...	...
Switchgear, station wiring	7.02	10.01	10.99	8.18	...	...	16.70	4.02	6.865	...	...
Station space factors											
Boiler room cf/kw	19.25	0.28	OD	12.45	8.36[5]	...	6.35	0.35	4.316	15.5	8.673
Turbine room cf/kw	10.08	0.18	OD	5.33	10.38	...	7.14	0.16	OD	8.0	8.86
Switch house cf/kw	...	0.02	0.4	0.68	0.10	...	...	0.005	0.092(Ctrl)	Incl.	0.863
Office, employee areas cf/kw	0.865	0.09	0.1	0.17	0.609	...	1.32	0.04	0.27	0.8	0.975
Building, ground area sf/kw	0.56	2.65	0.2	0.29	15.13[6]	...	0.18	1.70	0.177	0.5	2.94
Switchyard sf/kw	2.66	2.70	1.1	0.22	1.11	...	0.40	0.87	0.049	0.6	0.364
Fuel storage area sf/kw	0.254	7.19	1.7	2.14	1.88	...	0.46	2.08	0.195	3.0	3.13
Coal storage t/kw	...	...	...	0.69	0.055	...	0.33	1.15	0.341	2.0	0.91
Station details, see footnotes	E	...	...	BEMFm	BEM	CEFe	BEFme	A[4]BEFm	BDEFme	BE	BEMFm
Outdoor	...	J	IJK	IJK	IsJsK	...	IsJK	J	IJK	...	IJK
Capability rating group Mw	40–59	40–59	20–39	100–149	100–149	20–39	300–499	300–499	100–149	20–39	20–39
Turbogenerators no	1	1	1	3	2	5	4	3	1	2	2
Boilers no	1	1	1	3	2	5	4	3	1	2	2
Steam, pressure psi	1250	875	850	850	850 & 900	300 & 400	1500	1250	1450	600	900
temperature, initial supht F	950	900	900	900	900	550 & 825	1050	950	1000	900	870
reheat F	...	...	...	...	...	...	1000	...	...	...	...
Plant site area ac	109	1015.5	132.6	65.4	130	0.9	155	716.4	15	43	25.5
in use ac	7	193	15	25.6	50	0.9	65	348.4	15	15	15
Coal storage capacity M ton	...	...	...	100	100	4	150	400	100	50	50
Oil storage capacity M bbl	55.6	225	55	...	...	...	125	1.7	146	0.25	70
Years, initial oper & latest unit	51	11/52	51	50-51	50–51	95-50	48–51	50-52	52	50–51	51
Normal function	N	Q	NQ	N	NQ	N	Q	Q	Q	N	S

Plants use as fuel	Gas				Oil and Gas					
Station number	210 (123)	214 (167)	220	225	194	195	211 (155)	216	217	228
Investment data					Dollars per kw of capability					
Land	$0.67	$0.973	$2.92	$0.91	$1.35	$1.42	$0.72	$3.01	$0.562	$0.47
Structures, improvements	17.52	20.641	11.92	22.30	9.73	15.05	13.87	23.42	9.150	44.77
Boiler plant equipment	33.60	32.599	32.30	21.80	59.08	61.73	23.05	39.07	29.010	37.62
Turbogenerator unit	33.61	35.638	38.25	34.10	36.48	43.79	32.34	34.60	31.168	41.12
Accessory elec. equipt	8.42	6.369	6.79	12.50	9.46	15.68	7.08	14.92	4.631	10.44
Misc. plant equipt	0.59	1.915	1.14	...	2.71	1.88	0.57	1.11	1.163	4.39
Total station	**94.41**	**98.135**	**94.32**	**101.61**	**118.81**	**138.95**	**77.83**	**116.13**	**75.684**	**138.81**
Outdoor switchyard	6.02	9.008	6.68	Incl.	14.13	12.73	7.77	6.48	2.557	12.85
Total, station and switchyard	100.43	107.143	101.00	101.61	132.94	151.68	85.40	122.61	78.241	151.66
Building	...	...	11.30	...	7.72	10.84	5.26	9.50	...	...
Condensing supply works	...	...	10.79	...	3.25	8.65	5.90	10.53	...	...
Fuel handling	...	...	2.26	...	3.85	6.21	1.24	0.42	...	...
Ash handling	...	...	...	...	...	...	...	...	...	...
Draft system	...	...	2.72	...	5.97	7.55	...	2.04	...	...
Feedwater system	...	...	3.64	...	6.13	5.34	3.00	4.41	...	...
Piping system	...	...	4.50	...	14.05	12.56	4.22	7.77	...	...
Condensers	...	...	4.74	...	4.90	6.02	6.10	5.30	...	...
Switchgear, station wiring	...	...	13.48	...	9.46	15.68	6.61	14.92	...	...
Station space factors										
Boiler room cf/kw	OD	...	...	10 sf	OD	OD	...	OD	...	3.326
Turbine room cf/kw	0.959	7.509	...	10	8.62	7.236	...	OD	...	13.060
Switch house cf/kw	0.017	...	...	0.1	0.15	(Incl)	...	...	...	0.777
Office, employee areas cf/kw	0.004	0.29	...	0.035	0.46	0.2380	0.52	0.211	...	1.739
Building, ground area sf/kw	0.054	0.187	...	...	0.18	0.1759	0.004	10.90	...	0.525
Switchyard sf/kw	1.570	1.059	...	...	1.62	1.3269	...	0.187	...	0.873
Fuel storage area sf/kw	0	...	...	0.013	0.90	1.4918	...	...	...	0.238
Coal storage t/kw	0									
Station details, see footnotes	DEM	G	E	E	E	E	EM	EM	E	GEM
Outdoor	IJK	IK	IJK	IJK	IJK	IJK	IJK	IJK	IJK	IK
Capability rating group Mw	100–149	100–149	60–74	40–59	300–499	300–499	100–149	75–99	75–99	20–39
Turbogenerators No	3	3	1	2	3	3	2	1	1	1
Boilers No	3	1	1	2	6	6	2	1	1	1
Steam, pressure psi	850 & 1250	900 & 990	1350	225	1405	1405	920	1350	850	875
temperature, initial supht F	950 & 955	850	955	850	950	950	905	955	905	910
reheat F	...	900	...	900	...	...	...	...	...	...
Plant site area ac	180	45	450	10	278	278	401	20	20	31.2
in use ac	39	18	200	5	78	68	401	20	6	18.5
Oil storage capacity M bbl	...	0	27.5	16.5	300	480	25	179	80	30
Years initial oper & latest unit	48–51	49–52	51	51	51	50–51	49	52	51	51
Normal function	N	N	N	NO	N	N	N	NOQ	N	N

FOOTNOTES STATION DETAILS: •A Car dumper •B pulverizer •C stokers •D controlled circulation •E central control •Fm mechanical flyash collection •Fe electronic fly ash collection •G pressurized •H cyclone furnace •I outdoor boiler (semi s) •J outdoor fans (semi s) •K outdoor air heater •L spray pond •M cooling tower **NORMAL FUNCTION** •N Normal system station •O Normal distribution station •P Normal transmission station •Q Normal base load •R Standby •S Power & district steam •[1] throttle •[2] also 3,500 bbl oil •[3] includes bunkers and basement auxiliaries •[4] shaker car dumper •[5] housed portion and firing aisle •[6] incl. wells, cooling tower, switchyard and water control house.

Plants for burning coal cost generally from $100 to $165 per kw, for oil from $145 to $150 and for gas from $90 to $135. Coal handling facilities cost $1 to $3 per kw. Outdoor plants save from $5 to $25 of investment per kw. See full analysis on page 151.

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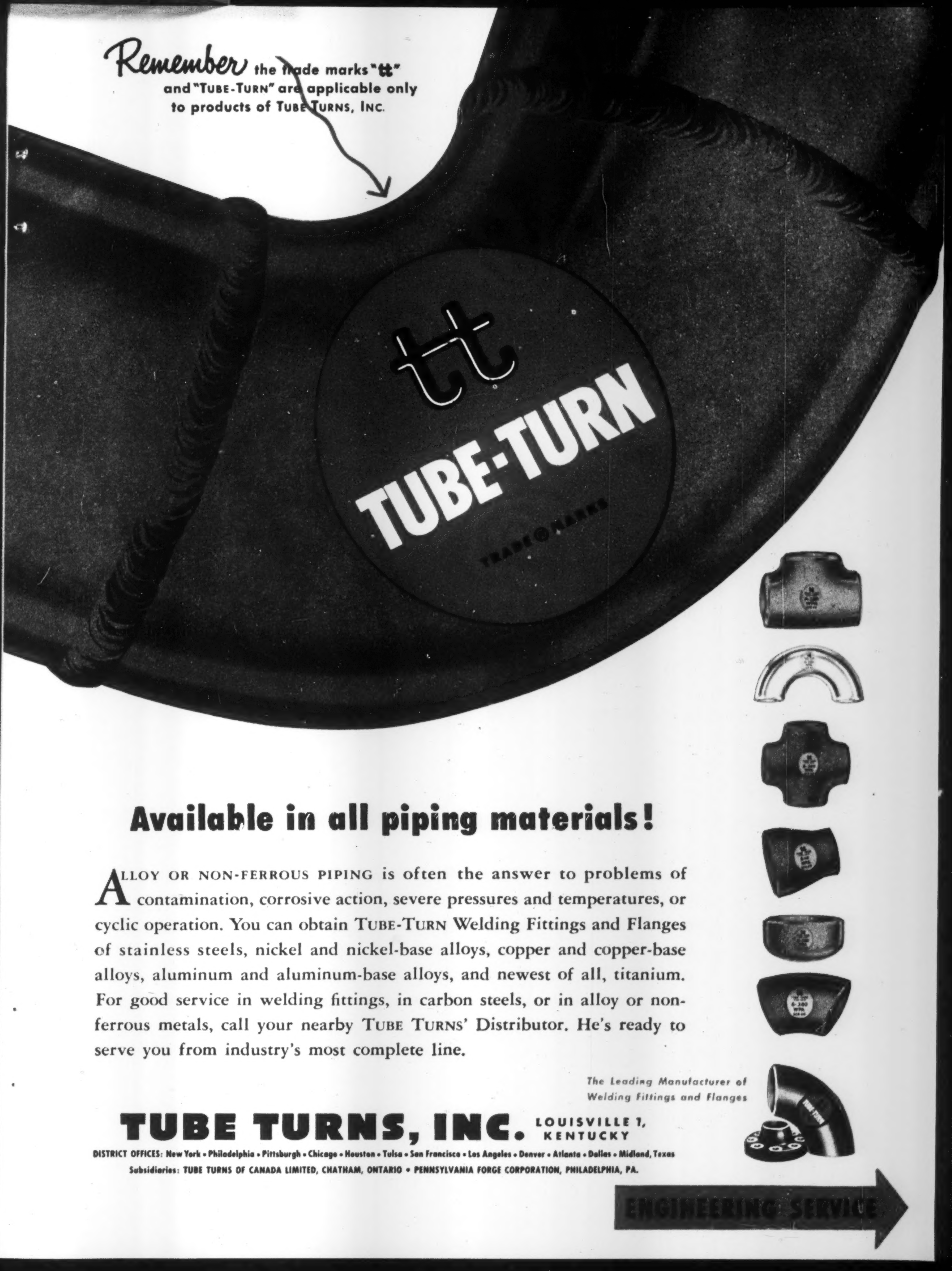

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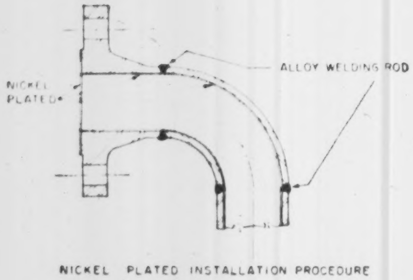
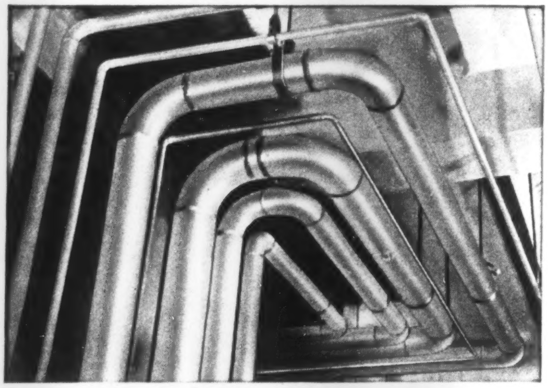


Installation procedure for nickel plated welding fittings and flanges.



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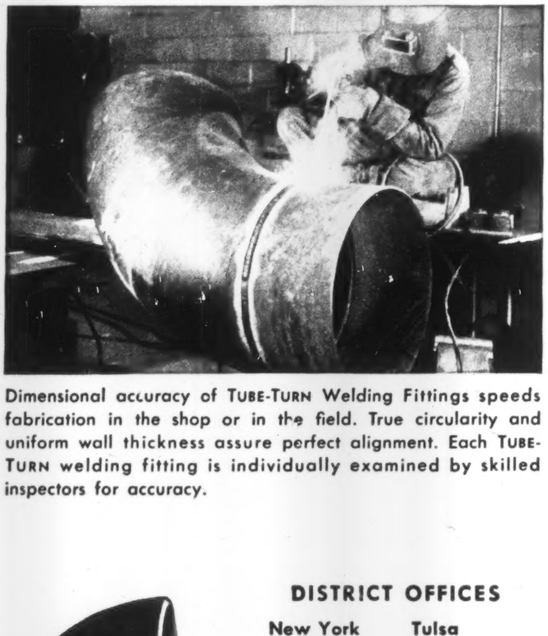

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Building skyscrapers—

One man estimates, lets contracts, schedules and pushes job out

ENR photo by Compton

EXPEDITER Carl Morse does his own estimating and contract negotiating.

"Get 'em in, and get 'em out, and the job will take care of itself," is the way Carl Morse sums up the handling of his subcontractors on the buildings he builds.

As vice-president in charge of construction of the New York general contracting firm, Diesel Construction Co, Morse is the man who should know. Diesel, a moderate-sized building firm headed by Erwin S. Wolfson, performs strictly as a contractor who constructs buildings for an owner.

Morse carries out Diesel's work almost as a one-man operation. He prepares the job budget for the owner, awards the contracts, and oversees all field coordination.

Graduated from Yale in 1925, Morse went right to work for the New York Realty and building firm of Bing and Bing. Beginning as an assistant construction superintendent, he has spent more than 28 years in the building construction field in Manhattan, and knows the business of putting up New York's typical skyscrapers from A to Z.

Carrying estimates in his head, lists of subcontractors almost at his fingertips, and knowledge strengthened by years of experience, Morse can handle almost single-handedly all the construction business involved in putting up a big building. He can build a skyscraper in as short a time as 12 months from breaking ground to installing tenants.

• A lot of work in hand—At the moment his firm is finishing a 27-story, $10-million office building at 261 Madison Avenue, New York, for the 260 Madison Ave Corporation. Ground was broken for this steel-framed, air conditioned building last December, and tenants will move in next February. Also under construction by Diesel are two office buildings at, 579 and 589 Fifth Ave. These two jobs are being built for Ivor Clark, owner, and will be 16 and 17-story structures, steel-framed, and air conditioned. Besides these three projects, Morse is handling several large alteration jobs in midtown Manhattan. He likes a lot of work going on and he likes to see it move fast.

• A race to the end—Once the first contracts are let on a job, construction gets rolling in the field and there's no let-up until the end. "No one loses money if they (subcontractors) get in and out, even if their price is low. It is only the man who is slow and fools around that loses his money and mine," says Morse. "On a typical office building in New York, $150,000 to $200,000 in rents can go down the drain for every month you delay in finishing the job."

Morse sets a construction speed schedule and sticks to it as closely as possible. On the 27-story structure at 261 Madison Ave. he was running two weeks ahead of his schedule when New York's nine-week truck strike caught him. But the truck strike will set him back only three or four weeks in his schedule.

Steel erection on this job averaged three floors every five-day working week. The last 12 floors moved at a rate of a floor a day.

Brickwork on the first floor of buildings like this will start before the steel erector has placed his final lift of columns and beams. The concrete contractor, who does the floor slabs, comes in as soon as he has a floor of steel, clear of the derricks, to work on.

• How a G-C ticks—The general contractor's organization behind actual construction in the field is carefully assembled and complex. The real start of a job comes when an owner calls in Diesel Construction and says that he wants a building. Diesel officials will tell him what it will cost and how long it will take to build after going over the architect's initial sketches.

• The first step: Budgeting—While the plans are still in the formative stage, Diesel works out a job budget to be presented to the owner.

Since the plans are still far from the final shape, only years of experience will help the estimator figure the cost of a job from a set of sketches. Morse figures that a commercial building in New York City will cost from $1.15 to $1.75 per cu ft for the basic construction. To this figure, in commercial building, he must add from $0.35 to $0.60 per cu ft for tenant layouts. To pinpoint exactly where the unit price lies, depends on a number of factors. Under the following general conditions the unit price per cu ft of building will be low rather than high:

- If the building is to be built in an open, accessible area.
- If there is bedrock at basement-floor level.
- If there are no buildings to shore up during excavation or blasting.
- If the ratio of periphery walls to cross-sectional area is low (a square would be cheaper than a rectangle).

(Continued on page 160)

- If the ratio of height of building to cross-sectional area is low.
- If there is a relatively small amount of construction work going on in the general region at the time contracts for construction are let.
- If no construction will be carried out in winter weather until the building is enclosed and the heat in operation.
- If the design, and construction methods involved in its execution are within current standard practice.

• **Plans and specs**—At the planning stage Morse will take the architect's initial plan and check for feasibility of execution. If something in the plan might prove too expensive for his budget, Morse will ask that it be changed, in conference with the architect, engineer, and the owner.

When the architect's specifications for each contract are ready, there'll be a check for inclusion of detailed points and any possible misinterpretations that might lie in wording. Morse puts his own addenda into the specs to avoid (1) misunderstanding, (2) extras the subcontractor might claim in doing his work on the job, and (3) to make the expediting of the ensuing contract easier for both the contractor and Morse himself. Diesel acts as the owner's representative and as such is not only free to discuss construction economies with the architect and engineer, but constantly must oversee the subcontractors' work in the field.

• **Estimating for letting contracts**—When the time comes for letting his contracts, Morse will do most of his own contract estimating. The accompanying table shows the figures generally used this year for estimating construction in New York City.

His knowledge of estimating is based on his long and intimate experience in the building field. He may have to use the telephone to find out what the latest unit prices may be, and he'll get answers. He gets the truth when he asks this sort of information, because his informants know that there'll be work to do.

When he knows what his contracts should cost (he usually can figure them within 5% of what they actually will cost), he calls in his subcontractors and takes the bids. From constant association with the building field in New York, Morse knows, within each type of contracting work, a whole group of competent firms with whom he has dealt. These firms, and perhaps some others recommended by the owner, will be called in to submit bids.

• **Choosing contractors** — In New York's metropolitan area, the general contractor is a coordinator of construction and awards contracts on practically all phases of construction. The general contractor normally does not put his own crews on the various trade work, except for general labor and field supervision. Subcontractors who specialize in a particular trade thus have much steadier employment for their men and can maintain an intact organization. No general contractor, Morse believes, has enough work going on all the time to warrant handling any of the trades.

One of the most important points in the business of general contracting is to develop a following of subcontractors. Morse puts it this way: "You must not favor one subcontractor consistently by offering him the job if he simply meets the competitive bid. You'll soon run out of subcontractors who are willing to bid for you."

In inviting bids for a contract, the general must be sure to invite the right subcontractor for a particular job. "For instance," Morse points out, "just because a man is a concrete contractor does not necessarily mean that he can do any kind of concrete. Another thing, the large subcontractor may not be geared for smaller jobs: A smaller sub may work out much better.

A third point: A sub who is tied up with a considerable quantity of work, may not be in a position to handle another job efficiently. But a sub who will have just completed several large jobs at the time he's needed will work out very well. This sub usually will have a low bid and he'll have enough of his men on the job to work fast and to keep his best crews with him. In regard to this whole point, the timing of bid requests and getting bids from subs who can use the job, will pay off."

Some more things that Morse keeps in mind when inviting subs to bid are (1) that the sub has experience in the particular type of work to be done under the specification; (2) that the subcontractor's financial position to carry out the work in hand is good; (3) one bad subcontractor can tie up the whole job and consequently make the owner and builder lose money.

• **Type of contract**—Morse warns that the general contractor must avoid awarding any contract on a "time and material basis"—"it has an adverse effect on all the other subcontractors' mechanics on the job, so that they may waste time and money in the belief that their bosses have 'time and material' contracts too," he explains.

If extras come up on the contract (due to changes in the building plans) they should be handled wherever possible at a lump sum price. "An apparently high lump sum price for extras is usually much cheaper than a 'time and material' charge would be for doing the same work." An axiom—that Morse usually follows in finding out how a sub has done on one of his jobs —"a sub who does well on a job, doesn't look for extras."

In commercial building construction those contracts affecting the layout of the tenant's floor space will be let on a "core and shell" basis. That is to say: Contracts like masonry, plaster, and electrical will be let on two major price groupings. The first of these will be a lump sum ("core and shell") covering the building's service areas, fixed exterior, and the like. The second major price grouping will contain unit prices for interior work which can't be completed until the tenant's desires and requirements are known. (Apartment building contracts are almost all lump sum, plus unit prices for possible extras.)

With these commercial building contracts, it is often difficult to tell at first glance who has the low bid. Morse explains it this way: "One man's lump sum for the core-and-shell may be low, but then he'll have his unit prices high enough so that, when he has completed the tenant changes, his total contract price is away over what somebody else's might have been. The firm with a high lump sum core-and-shell price and lower unit prices for tenant changes may work out a lot cheaper for the builder in the end."

Morse usually figures an overall unit price for tenant changes. This means that in estimating the total job—in order to work out his initial budget—he'll figure from $2.50 to $5.75 per sq ft of tenant's floor space for the tenant changes. An average of $3.75 per sq ft of floor space usually covers this, both for the tenant whose needs and layout are relatively simple and for the tenant who is going to want partitions and electrical outlets all over his office space.

• Actual cost of a building

For estimating costs, the accompanying table gives unit prices that are applicable to budgeting the construction of a complete office or apartment building. "F&I" indicates "furnish and install," and the accompanying unit price includes the contractor's plant on the site (i.e. scaffolding, mortar mixing machines, etc.)

• **Wrecking and excavating**—The usual group of buildings to be wrecked in New York are old brownstones or brick tenement homes. A group of four can run from $16,000 to $20,000, the price being lower for those buildings that have salvagable fixtures, appointments, and materials like steel or marble. A big wrecker may have good contacts with junk contractors who will buy the salvage from him, or he may act as a junk contractor himself, but that won't necessarily make his price any lower for wrecking.

After wrecking, it is cheaper all around to let the excavator's shovel remove masonry and rubble from the site. Earth and rock removal are lumped out to an excavation contractor. The excavation sub usually does not operate a fleet of trucks and consequently subs out the trucking of rock and earth in his contract to a third-party trucker. This process is invariably cheaper for the builder and owner, since the excavation man is on a good business basis with any number of truckers.

The price for excavation goes up as the building site becomes (1) smaller, (2) more inaccessible, and (3) will require more underpinning of neighboring buildings.

• **Piles and foundations**—Pile driving is usually sublet by the excavation contractor, because he works in conjunction with the pile driver on the job.

The price for foundation reinforcing goes up as the reinforcing becomes smaller. Foundation and wall concrete is figured all together, furnished and put in place with a bucket and crane or a chute. The foundation and wall concrete estimate figure is not to be confused with ready-mix concrete. The ready-mix estimate is for the builder who buys his concrete at curbside and will have it placed by another contractor.

• **Concrete arches**—These prices include building the forms for the slab. The relatively higher price for light weight concrete arches—as compared with the actually lighter cinder or grit concrete—is due to the heavier formwork required to place these arches. The formwork for lightweight concrete is heavier since this type of slab is used for longer spans. (2x10's may be needed for form joists in big bays.)

In budgeting a whole building it should be remembered that the stronger lightweight concrete works out as inexpensively as grit or cinder concrete since less structural steel will be needed in the framework of the structure. The total figure of concrete plus steel is the governing factor on which type of arch should be used. Furthermore the wider spans and bays allowable with lightweight concrete may eliminate some hung ceilings in the building and save on the elimination of beam arrises to be plastered.

• **Reinforced concrete**—This estimate figure is applicable to a whole building of reinforced concrete construction with 6-in. floor slabs. The figure includes the polishing of ceilings for direct application of paint (no plaster on ceilings).

• **Steel work**—This figure includes the furnishing, fabricating, and erecting of a complete steel structural frame. If the plot layout is angular or broken up into wings and patios, the price is higher. If there are many light structural sections, involving more handling per ton, the price is higher. Steel joists are erected in conjunction with the steel frame by the structural steel contractor. His price for erecting the joists is included in the estimate figure.

• **Exterior and interior masonry**—The estimating unit prices for exterior and interior masonry includes furnishing the materials and laying up the brick or block. In figuring the cost of exterior walls, the price for back-up block must be added to the brick. Exterior brick runs from $1.60 to $2.00 per sq ft. This price is for a complete building. Price variations run from mass brickwork on the low side to isolated, angular, and artistic brickwork on the high side.

• **Heating**—This estimate is based on a rule of thumb: 1 sq ft of radiation is required for every 80 to 100 cu ft of building in New York. The more exposed the building, the more radiation will be needed. This rule of thumb does not take into account the steam needed for hot water. In an apartment house, from 33% to 50% of the steam produced will be needed for hot water; in a commercial building the hot water load on the steam

Unit prices for estimating construction budgets in New York City, 1953
F&I: furnish and install; FP: fireproof

Items	Unit	Unit price range
Wrecking & removing group of four 5-story buildings, 25 x 100 ft ea	group	16,000–20,000
Rubbish removal	cy	1.30– 1.80
Earth excavation, city	cy	2.70– 3.00
Rock excavation, city	cy	7.75– 9.00
Earth excavation, open areas	cy	1.25– 1.75
Pile driving, 12 & 14" steel H's, F&I	per ft	9.00–13.00
tapered concrete to 18', F&I	per ft	5.75–7.00
tapered concrete more than 18', F&I	per ft	7.75– 9.50
Foundation reinforcing, F&I	per ton	260–320
Foundation forms, piers, face side, F&I	sf	0.60– 0.75
walls, face side, F&I	sf	0.75– 0.90
Foundation concrete, piers, footings, F&I	cy	20.00–22.00
walls, F&I	cy	22.00–24.00
Ready-mix concrete, 3000 lb test, F only	cy	12.50–13.50
Ready-mix concrete, 2500 lb no test, F only	cy	12.00–12.50
Concrete arches, 4" cinder concrete, F&I	sf	1.10– 1.25
4" gritcrete, F&I	sf	1.20– 1.35
lightweight concrete, F&I	sf	1.30– 1.45
Finish cement, 1" & steel trowel, F&I	sf	0.18– 0.23
Reinforced concrete structure, F&I	sf	2.35– 2.75
Steel structure, F&I	per ton	250–295
steel joists, F&I	per ton	285–310
Exterior brick, F&I	per 1,000	175–225
Aluminum exterior, with sash, F&I	sf	7.00–10.00
Granite facing, 1" & 2" thick, F&I	sf	9.00–13.00
Cast stone copings, trim, F&I	cf	7.00
Interior masonry, 3" gyp block, F&I	sf	0.40– 0.48
ceramic tile walls, F&I	sf	1.40– 1.75
ceramic tile floors, F&I	sf	0.90– 1.15
structural facing tile, one side, F&I	sf	1.60– 2.00
6" cinder back-up block, F&I	sf	0.55–0.65
Plastering, two coats on masonry, F&I	sy	1.80– 2.00
three coats on lath, F&I	sy	2.00– 2.30
Lathing metal hung ceiling, F&I	sy	3.25– 3.50
Flat metal hung rock lath ceiling, F&I	sy	3.60– 4.25
vertical metal wall furring, F&I	sy	3.30– 3.50
Acoustical tile ceilings, F&I	sf	0.43– 0.54
Carpentry, doors and bucks, I only	per opening	11.00–15.00
trim, lumber, F only	per rm	40.00–70.00
metal kitchen cabs, F only	per apt	150–200
trim, rough and finish, FP, I only	per rm	75.00–85.00
trim, rough & finish, non-FP, I only	per rm	115–135
Flashing, copper, F&I	per ft	1.50– 2.00
through copper, F&I	per ft	2.50
Insulation, 2" Foamglas, hot pitch, F&I	sf	0.30– 0.35
1" Fiberglas, hot pitch, F&I	sf	0.20– 0.25
Waterproofing, 5-ply felt, no slag, F&I	sf	0.18– 0.20
5-ply felt, slag, F&I	sf	0.22– 0.24
Marble Wainscot, F&I	sf	4.00– 6.50
Floors, cork tile, 5/16", F&I	sf	0.45– 0.54
oak parquet, F&I	sf	0.50– 0.60
terrazo, F&I	sf	1.15– 1.35
quarry tile, expansion joint, F&I	sf	0.75– 0.85
rubber tile, 1/8", F&I	sf	0.40– 0.45
asphalt tile, 1/8", F&I	sf	0.14– 0.18
linoleum, battleship 1/8", F&I	sf	0.30– 0.35
Heating, F&I	sf radiation	3.75– 4.75
Sprinkler, F&I	per head	32.50–42.50
Plumbing, F&I	per fixture	190–265
Ductwork, sheet metal, F&I	per lb	0.58– 0.76
Louvers, galvanized, F&I	sf	2.50– 3.00
aluminum, F&I	sf	6.00– 8.00
Airconditioning, F&I	per ton	1,000–1,100
Doors, hollow metal, no hrdwr, F only	ea.	32.00–50.00
kalamein, no hrdwr, F only	ea	23.00–28.00
wood, non-FP, no hrdwr, F only	ea	8.00–14.00
wood, FP, no hrdwr, F only	ea	32.00–43.50
rolling, overhead, with mech, F&I	sf	4.50– 6.00
bucks, metal, F only	ea.	6.50– 8.50
Window sash, DH, steel & alum, F only	sf opening	2.00– 2.50
casement, steel resident, F only	sf opening	0.60– 0.75
casement, intermediate, F only	sf opening	0.75– 0.90
Glass, double thick, F&I	sf	0.45– 0.55
double plate, F&I	sf	0.85– 1.10
Electric, whole building	sf	0.50– 0.75
additional	per outlet	20.00–30.00
Light fixtures, surface mounted, 3-Light 40-watt fluorescent, F&I	ea	22.00–30.00
recessed, 3-light, 40-watt, fluorescent, F&I	ea	27.50–45.00
Elevators, automatic 6-story, apt F&I	ea	11,500–13,500
automatic 15-story, apt, F&I	ea	35,000–40,000
automatic 15-story, commercial, F&I	ea	55,000–65,000
Stairs, iron pan construction, per fl, F&I	ea	275–350
Mailchute, 15 to 18-story, F&I	ea	3,000
25 to 30-story, F&I	ea	5,500
Paint 3 coats, F&I	sf	0.06
Paper, F&I	per roll	2.25– 4.60
lining, F&I	per roll	1.15
Venetian blinds, metal, F&I	sf opening	0.25– 0.30

may run to only 5%. The estimate figure includes furnishing and installing of tank, boiler, controls, pumps, convectors and covers, valves, fittings, and pipe for a whole building. The better the equipment and more complicated the control system, the higher the price.

• **Sprinkler**—This price takes in the whole installation of a sprinkler system and is based on the total number of heads in the job. If only the basement and parts of the first floor are to be sprinklered, there are relatively few heads, and the water connection is made into the street main. The more heads being used the lower the unit price.

The estimate still holds if a whole building must be sprinklered. In a big job involving every floor, a roof tank must be put in, and pumps and risers must be installed, but the estimate still holds, because the great number of heads involved absorb the small cost of extra equipment.

• **Plumbing**—This estimate—based on the price of the fixture (i.e. toilet, basin, shower, tub, urinal)—includes vent, waste, hot and cold risers and crotons, tank, pumps, valves, and faucets, etc. The number of fixtures in the job multiplied by the unit price gives the plumbing estimate for a whole building.

• **Ductwork**—This price, based on the weight of metal, automatically takes into account the length of run, gage of the sheet metal, and size of the duct.

• **Air Conditioning**—Morse figures one ton of air conditioning per 300 sq ft of floor area. Although some engineers figure air conditioning on a basis of sq ft of exposed exterior wall, including window areas, some find it convenient to figure on floor area. The price figure that is quoted includes ductwork, furnishing and installing of controls, fans, filters, compressors, refrigerating machine, cooling tower, pipe and fittings.

• **Electric**—This price is used for figuring a whole building and includes switches, distribution panels, junction boxes, heavy-and-light-duty outlets and runs, conduit and risers, and hardware, all furnished and installed. Tenant changes come under the additional outlet estimate.

Morse figures that the electrical load on a building will run from 4 to 6 watts per sq ft of floor area. In figuring light fixtures, he allows one 3-tube 40-watt fluorescent for every 80 sq ft of floor area at an intensity of 30 ft-candles.

German housing cost ratios

Builders in Germany use 2.4 man-hours on the site where one is used on similar construction in the US, yet over all labor cost runs about 50% of the total, a favorable comparison with US costs.

These and other cost ratios come from housing built in 1951 for US Air Forces in Western Germany. It consists of four buildings, each a series of Y forms in connecting wings to form a half circle, each with four staircases. Each staircase serves three wings. The project provides 128 apartments, eight 4-bedroom, eighty-four 3-bedroom and thirty-six 2-bedroom units.

The buildings have three floors and a basement, flat roofs, car shelters inside the buildings.

Total cost was $1,420,000 with $140,000 of this going into roads, sewerage, water lines and other utilities. Unit costs are $0.44 per cf for buildings, $0.04 per cf for roads and utilities. Buildings are 2,780,000 cf in volume, 302,000 sf in ceiling area plus 7,900 sf of car shelter and 9,000 sf of servants' quarters in the basement. H. W. Puell, chief engineer, Julius Berger, Tiefbau—Aktiengesellschaft, Wiesbaden, supplied these figures.

Prefabricated concrete ceilings in the German project account for the big difference in cost of carpentry between the German and US construction in the accompanying tables.

The other unusual feature in the German project was the use of wire mesh forms for construction of the walls.

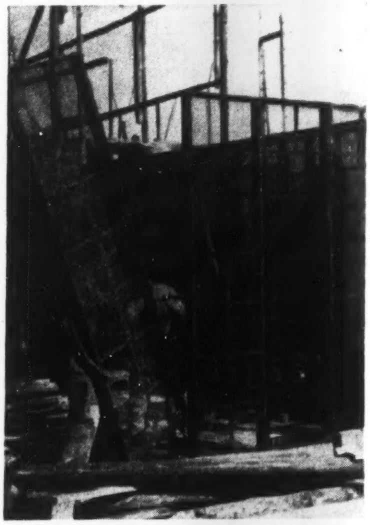
This equipment was used: 5 Diesel shovels or draglines, 4 Diesel bulldozers, 55 hp to 165 hp, 19 concrete mixers, 0.2 cy to 1.0 cy, 14 material elevators, 3 hammerhead cranes (placed concrete, prefabricated ceilings and form work), 480 lf of conveyor belts, 92 M sf of steel wire mesh form work.

One of the accompanying tables compares distribution of costs with a similar American project.

The other table compares project, labor and material costs both in dollars and terms of working hours. The prices of building materials shown in this table are 3.1 to 5.7 times as high as in the USA based on the value of one man's hours.

But construction cost in site hours is only 2.4 times as high as in the USA. This indicates comparatively high productivity.

The 50% of total building costs which goes to labor in both countries means that American builders use less site labor at higher wages, more mechanization and prefabrication.



SETTING WIRE MESH FORMS cost 0.063 hrs/sf at the first building, was reduced to 0.05 hrs/sf at the second and to 0.044 hrs/sf at the third building.

Building cost of housing project G in Germany compared with project US in USA (based upon value in $)

Item	G—Germany	US—USA	G %	US %
Excavation and backfill	$20,600	$83,000	1.4	2.3
Concr foundations and walls reinf, concr ceilings, masonry, window sills, etc	464,000	940,000	32.7	26.5
Lath & plaster	95,500	276,000	6.7	7.8
Carpentry	4,600	375,000	0.3	11.1
Roofing & sheet metal	17,500	96,000	1.2	2.7
Asphaltwork	......	......	....	...
Asphalt floors	176,000	59,000	12.4	1.7
Hard wood floors	......	......	....	...
Misc & orn metal & struct steel	13,500	85,000	1.0	2.4
Doors & windows Screens, etc	222,000	320,000	15.6	9.0
Build-in furniture & cabinets	......	......	....	....
Painting & decorating	43,600	54,000	3.1	1.5
Building structure	**1,057,300**	**2,288,000**	**74.4**	**65.0**
Stree work, yardwork, final clean up	36,800	165,000	2.6	4.6
San sewers & water distr sys	78,000	112,000	5.5	3.2
Total for general construction	**$1,172,100**	**$2,565,000**	**82.5**	**72.8**
Plumbing	94,000	348,000	6.6	9.9
Heating	94,000	435,000	6.7	12.3
Electrical	58,000	175,000	4.2	5.0
Total for all construction	**$1,418,100**	**$3,523,000**	**100.0**	**100.0**

Unit building costs compared per average working hour

Item of cost	Cost per unit		Working hours per unit		G hours per 1
	G	US	G	US	US hr.
One average working hour	$0.39	$2.18	....	....	....
One cubic foot total structure	0.36	0.75	0.92	0.34	2.7
total construction	0.48	1.21	1.23	0.56	2.2
Sand ......per ton	1.15	2.05	2.95	0.94	3.15
Cement, bulk .....per bbl	2.80	3.15	7.20	1.44	5.00
Concr, rdy-mix 1:2:4	....	11.00	17.40	5.05	...
Reinf. steel per cwt	6.75	6.45	....	2.96	5.88
Lumber, #2 2×4 S4S...per mfbm	121.00	153.00	310.00	70.20	4.40

(US information based on Engineering News-Record Sept. 4, 1952)

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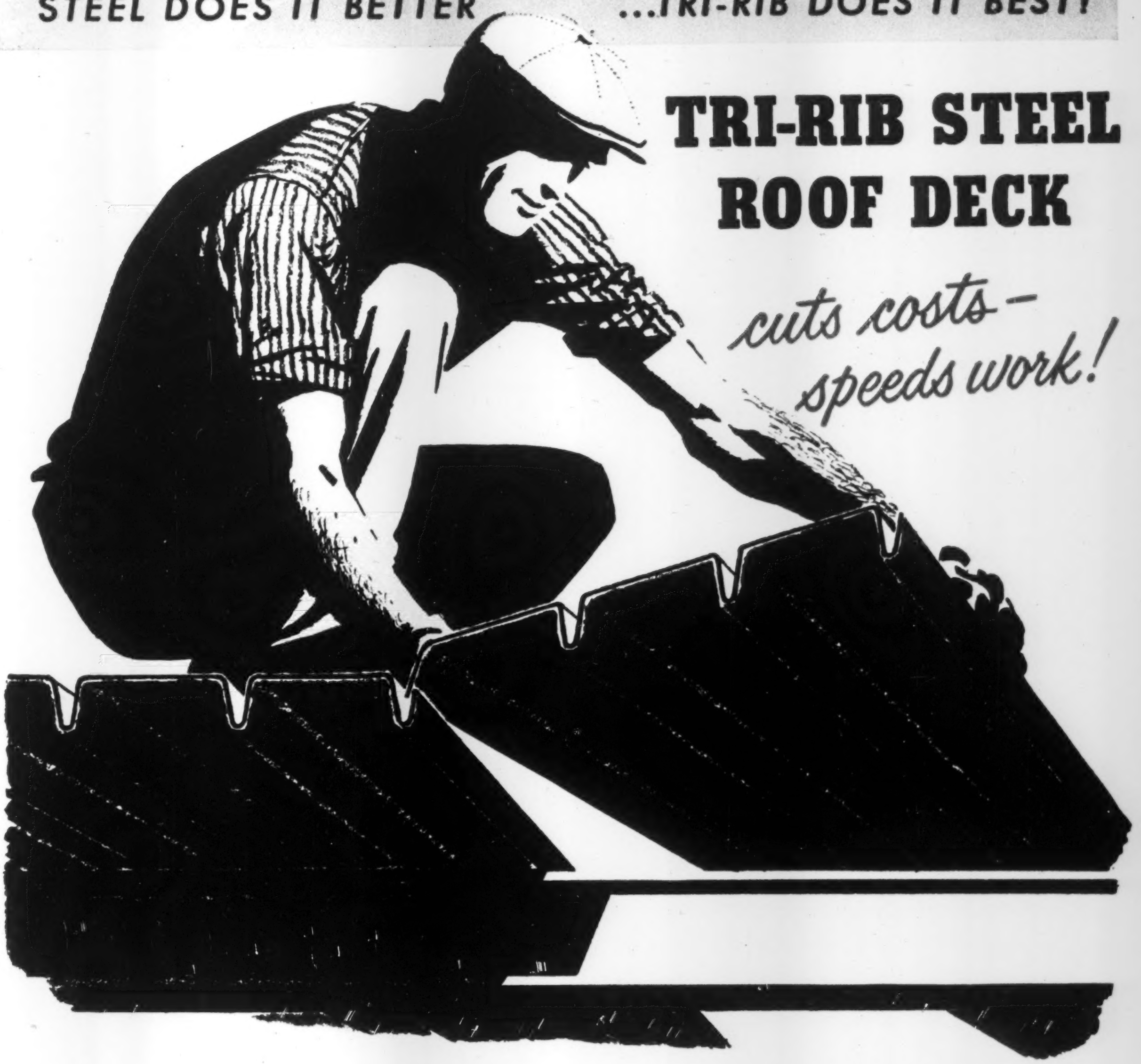

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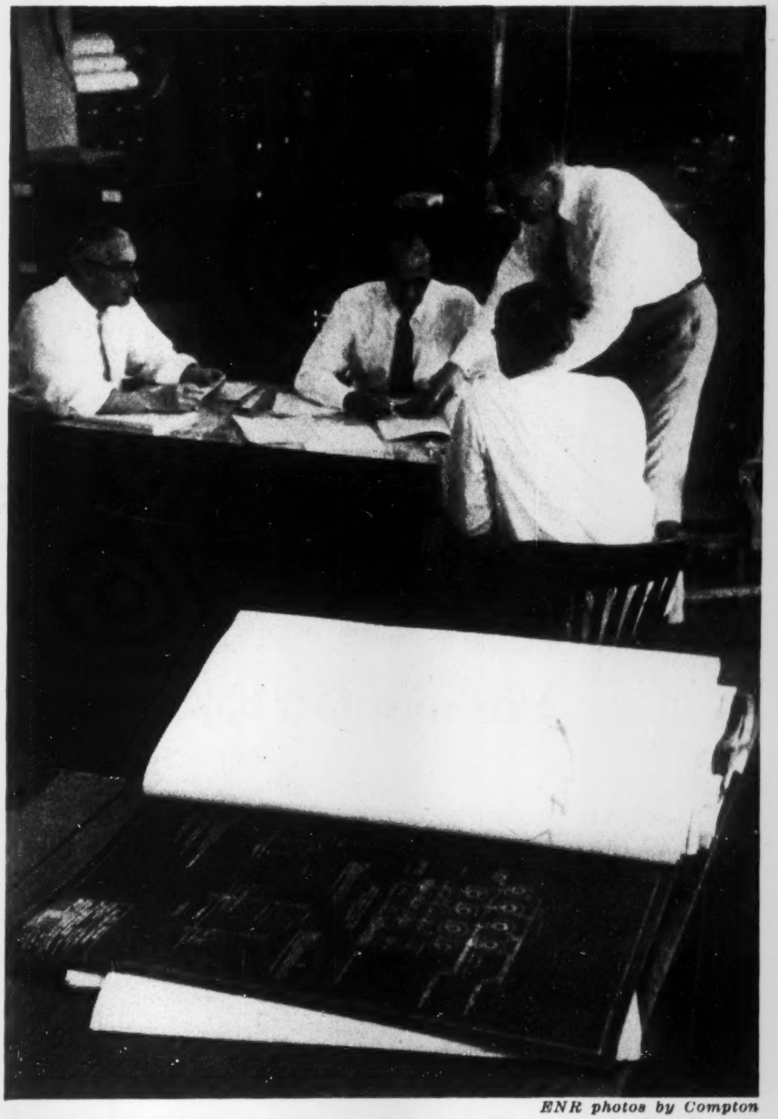

ENR photos by Compton

COST CONFERENCE—C. F. Rosenburgh (center), Turner vice-president for estimating, goes over final details before company submits its bid.

To a construction company that bids on fixed-price contracts, the cost estimating function is a key to success or failure. For of course the precision with which a contractor can estimate the cost of a job determines the soundness of his bid, and whether or not he can make money on the contract if he gets it.

That's why Carleton F. Rosenburgh, vice-president in charge of estimating for Turner Construction Co., is an important figure in Turner's New York City headquarters. He supervises the cost estimates that form the basis for Turner's bids.

Rosenburgh's tools are: A slide-rule; a telephone; 20 years of experience in cost estimating for Turner, plus about 10 years of construction experience with the company before that; and, finally, the company cost records on thousands of past jobs, ranging from office buildings, warehouses, and factories, to laboratories, hotels, and clubs. He has a staff of five to help him.

These estimators all have spent at least five or six years in the field, on the construction side of Turner's operation, and most have spent a year or two with the cost control department, which keeps track of how costs actually work out after Rosenburgh's men estimate them. They have to have a broad knowledge of construction methods, in addition to prices and costs.

Here's how Rosenburgh and his staff operate:

A new office building is being planned for midtown. Turner's sales department has been following the project for a long time, and has decided that the job will be attractive. So when the project is put out for bids, Rosenburgh gets a copy of the contract, specifications, and drawings. He assigns it to one of his estimating engineers.

This estimator will study the contract and specifications to see that they include no conditions which Turner would not want to assume. For example, the contract should not put the general contractor in the position of guaranteeing the adequacy of design for any part of the structure. Such guarantees, Turner believes, should be made by the designer.

The estimator will then proceed to figure the quantities of materials that the job will take. While he is doing this, Turner's purchasing department will review the specifications and drawings to determine what work should be subcontracted.

Turner itself will usually handle foundation work, reinforced concrete work, concrete fill and finish work, masonry, and rough and finished carpentry. The rest may be subcontracted. The company keeps a listing of subcontractors in the various trades it is likely to use, broken down by the major areas where it operates.

In the case of this office building, 35 to 40 subcontracts may be involved, and Turner might send out 500 or more postcards to subcontractors, inviting them to submit bids.

Meanwhile, the estimator has fin-

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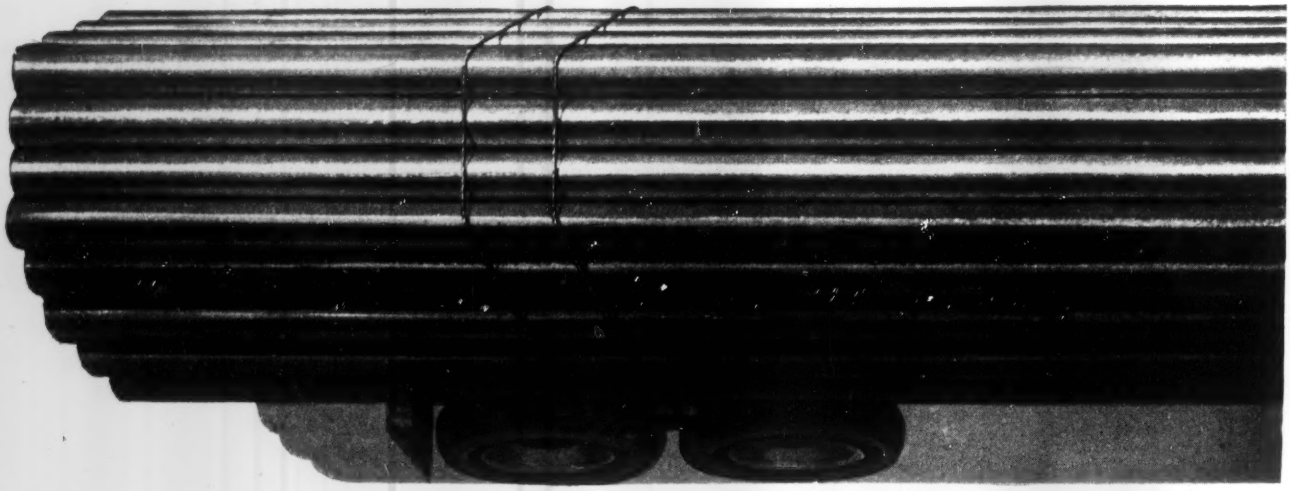

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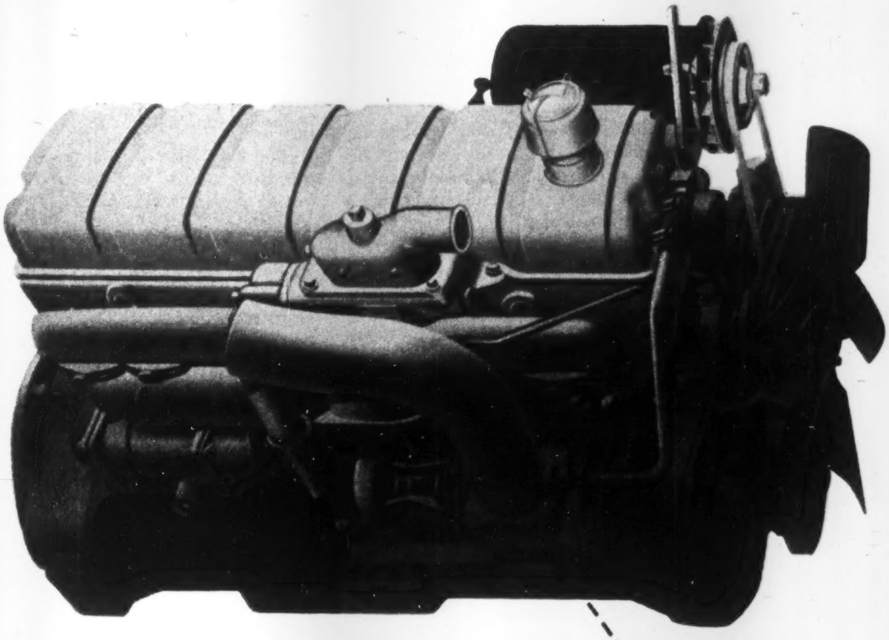

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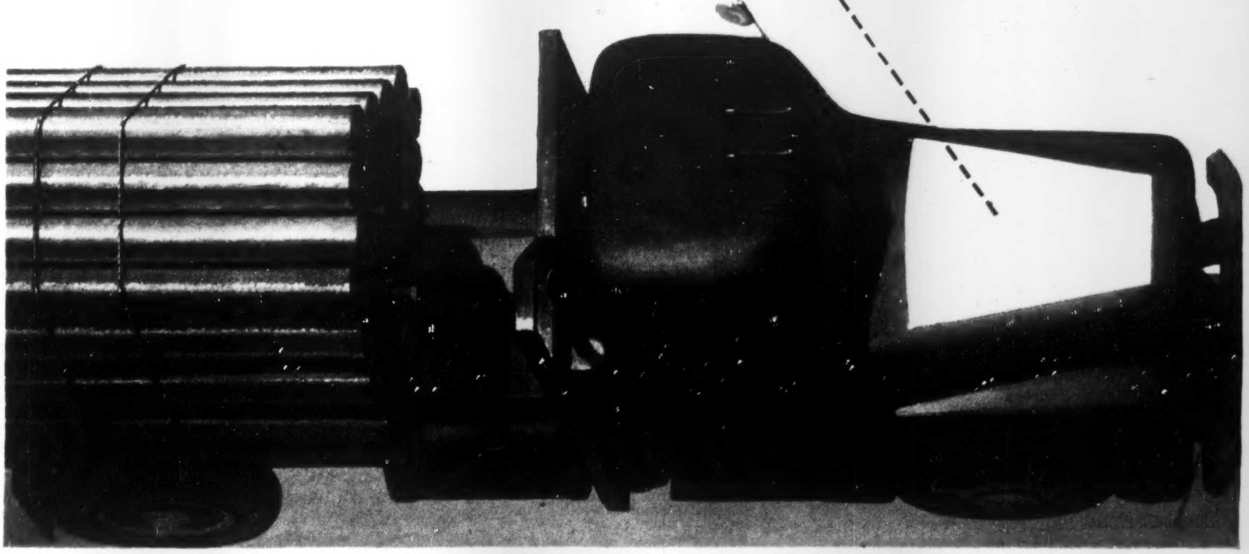

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DRAWINGS—Rosenburgh and estimator Gibson Allen (right) discuss blueprints.

ished working out his quantities. He'll now have some idea of the problems that could arise during construction. With these in mind, he'll study the site itself.

From this study comes a written report, covering such points as: Condition of buildings to be torn down, accessibility, soil conditions, available working space at the site, additional space that could be rented, availability of steam and electric power, whether adjoining buildings will have to be protected, and whether public utilities will have to be moved in the course of the work. All these factors, naturally, could have quite an effect on costs.

This job happens to be in New York City. But if it were a factory, say, somewhere out in a less populated area, Turner's estimator might have to consider these additional problems: How workers are to be transported, fed, and housed; hospital facilities; existing wage rates in the area, and what jurisdictional disputes are likely to come up; availability and efficiency of local labor; facilities for bringing materials to the site.

The next step is to work out a progress schedule for the job. This is essential, whether or not the contract specifies a definite date for completion. The only way a contractor can make money is to avoid waste motion. Thus, a time schedule is essential to any construction plan. The purchasing department must know approximate delivery dates for materials. Subcontractors must be able to plan when they will have to report to the job. Working out a progress schedule also establishes the time of year when the work will take place, determining allowances for such indirect costs as weather protection, temporary heat and light. Weather also will affect labor unit costs. And this progress schedule also will determine if workmen in the various trades can be expected to be readily available when they will be needed. This will affect labor costs, too.

In order to complete the progress schedule the estimator must go further than this. He works out a fairly detailed plan of the work. He will determine whether it is more efficient to mix concrete at the site or haul it there. He will plan, tentatively, where hoists, cranes, storage piles, and so forth will be spotted on the job for best efficiency. He will work out, step by step, the most efficient way to do the job.

This done, the Turner estimator will check his company's records of actual cost experience, broken down into Turner's detailed classification of phases of the work. For each aspect of the job, these records will show; (1) actual quantities used, (2) unit cost of labor and materials (3) total expenditure for that particular phase.

By this time, the estimating engineer will have received from Purchasing the price quotations from material suppliers. He will have to use his own judgment on the trend of prices in coming months, in order to estimate the actual cost of materials when purchased. He also will, of course, be familiar with wage rates, and will have his opinion as to whether these rates will change during the course of the job.

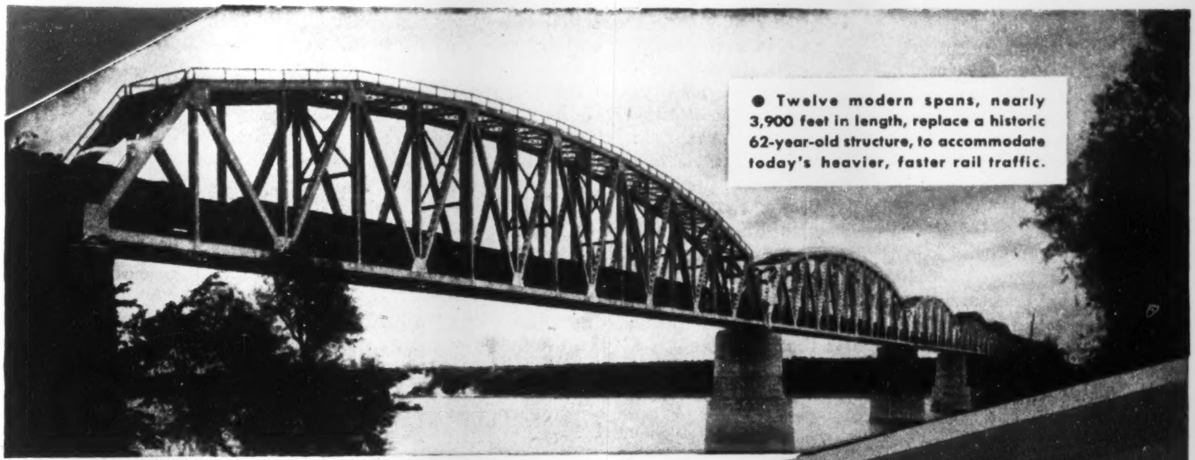
The estimator is now ready to work out direct costs on the parts of the job Turner expects to do, or may possibly do. On his pricing sheets, he puts down the quantities of each item that will be needed. Next to each item goes its unit cost, broken down as to materials and labor. In the next column comes the total cost for each item.

In order to check bids from subcontractors, the estimator also studies the extent of the work offered for bidding and arrives at general estimates for their cost. It's important that he screen the bids made by subcontractors to weed out bids that are unrealistically low. Such bids, of course, can lead to nonperformance of the work, possible bankruptcy for the trade contractor, delay for the client, and damage to the general contractor's prestige and pocketbook. That's why the Turner people are quick to check

HOW TURNER FIGURES INDIRECT COSTS

(a hypothetical case)

		Total	Labor included in total
Labor & Materials		$1,800,500	$720,000
Tools & Supplies	$22,000		......
General Expense	50,000		25,000
Fire Insurance	11,500		......
Cleaning	30,000		27,000
Job Office & Field Staff	83,000		83,000
Scheduling	12,000		......
Scheduling Top Charge	6,000		......
Watchmen	7,200		7,200
Plant Rental T.C. Co	2,500		......
Plant Rental Others	6,000		......
Installation, Repairs, Transp.	7,500		3,850
Temporary Buildings	6,000		3,000
Temporary Roads	4,000		3,200
Temporary Light & Power	9,500		6,000
Temporary Heat	15,000		10,500
Temporary Water Lines & Water	1,500		950
Winter Weather	8,600		5,200
Protection	1,500		950
Sales, Use & Assoc. Taxes	23,000		......
Workmen's Comp., & Soc. Sec.	80,600		......
Paid Holidays, Fringe Benefits	24,000		......
Retirement Benefits	3,500		......
Building Permit	3,000	417,900	......
		2,218,400	895,850
Subcontracts		4,950,000	
		7,168,400	
Contract margin (to be negotiated)		......	
Performance & Payment Bond (as required)		......	
Gross Receipts Tax (1/5%)		......	
Total cost, not incl. Margin & Gross Receipts Tax		7,168,400	



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with abnormally low bidders, to see if they have forgotten anything.

At the same time, to get an independent check on the estimator's judgment, the project executive in the construction department who will manage the work if Turner gets the contract is called on to give an independent opinion on costs of labor and materials, to work out his own idea of the time schedule and job strategy, and to estimate the work force required. By working separately, the estimator and the construction executive are often able to uncover conditions that might pass unnoticed if they worked out the estimate and schedule together.

The next step for the estimator is to work out the general overhead or indirect costs of the proposed job. These include: office and field staff, rental of construction equipment (usually from Turner's own shop), installation of equipment, temporary light, heat, and power, insurance, and taxes.

It is in this phase of the estimate that the inexperienced contractor often goes wrong. He may figure indirect costs as a flat percentage of the job, without analyzing them any further. In that way, the allowance for indirect costs becomes a catchall item —hiding any indirect cost that the contractor may have forgotten to allow for in his percentage, and possibly some direct costs, too. It also will cover up the places where he has overestimated costs.

The contractor who uses this method of figuring a job may make money on it. But luck, not good management, is the reason for his success. He learns nothing from his experience, and probably will over-reach himself on another job. On the other hand, the contractor who allows for every indirect cost as carefully as he allows for direct costs will know where he makes his errors, if indirect costs do not work out as expected. He may lose money on the job, but at least he learns something.

Indirect costs, as a percentage of total cost, may vary, depending on a number of different factors. They will vary with the nature and the size of the job, the time of year, the length and location of the work, and the amount of work performed by the contractor's own forces. Reproduced on page 168 is Turner's checklist for figuring indirect costs.

"Indirect costs," says Rosenburgh, "may vary from 6% to 15% of the cost of the job. Of course, the bigger the job, the lower the ratio of indirect costs. However, we find that when the project gets up somewhere around the $6-million or $7-million bracket, the ratio levels off around 6%."

As a separate check on the final cost estimate, Rosenburgh and his estimators may take the actual cost per sq ft of a similar office building put up in the past, and adjust it by ENR's Building Cost Index and by Turner's own index. That gives them a separate, independent check on their own estimate. The Turner index, incidentally, includes an allowance for productivity of labor and efficiency of plant and management, based on Turner's current cost experience. For instance, suppose the actual labor cost of placing a particular type of form work was 10¢ per sq. ft. in 1939, when the labor rate was $1.75 an hour. Now the labor rate for the same operation is $3.30 an hour. So you might figure that the labor cost of this work is now about 19¢ per sq. ft.

But this is assuming that productivity of the labor and efficiency of plant and management remain the same. If, by checking current cost records, it appears that it is costing 23¢ per sq. ft., the contractor must assume that labor productivity is now only 83% of what it was in 1939. Carrying out this process for a wide variety of labor operations gives Turner an overall correction for productivity which is worked into its index.

Finally, Rosenburgh and his estimator will sit down with: Richard Marzari of the purchasing department, who has been responsible for getting bids from subcontractors; William B. Ball, who as vice-president for Purchasing is Marzari's boss; and, probably, the project executive who actually will supervise construction of the job if Turner gets the contract. The contract manager from the sales department who originally brought in the job will sit in with the group, too.

By the end of this meeting (picture page 165), the total estimated cost has been determined, including all direct, indirect, and subcontract costs, exclusive of the contract margin or markup. This, last of course, is a policy decision, in which Turner's president, H. C. Turner, Jr., and George E. Horr, executive vice-president, may participate. The meeting usually starts on the day before bids are due, and may extend into the early hours of the morning.

What's been described is the preparation of a fixed-price bid. However, Turner also handles each year somewhere around 150 "budget estimates." These are approximate estimates, based on the data available early in the prospective client's planning for a project, in order to give him an appraisal of its cost. Turner also does quite a bit of fee work. A little more than half of its contracts through the years have been of this type.

As Rosenburgh says: "That's a healthy distribution. The fact that we are able to bid jobs successfully in competition with others, and carry these jobs out profitably, demonstrates that we are cost conscious." Turner not only knows its costs, but has been unusually open about publishing its average costs and cost ranges on various types of buildings. And, incidentally, that's good public relations for the firm.

Naturally, the test of how accurate the estimate is comes only if Turner is the successful bidder. Then the cost control department has the function of matching up how closely actual job costs come to estimates, and finding out the reasons for discrepancies.

If the bid is successful, Rosenburgh's estimator takes his cost estimate and breaks it down into a very detailed cost analysis of the various aspects of the job.

As work progresses, all costs are recorded at the site in accordance with the classifications which match the code used by the estimating department in setting up the cost analysis estimate. Every two weeks, the cost man sent from the cost control department makes a survey of the physical work completed, and compares this with the total labor expenditures to determine unit costs of the work already done. This can then be checked with the cost analysis to determine whether the job is staying within the estimate.

Each month, the cost man analyzes the labor cost report and other cost records. He prepares a report showing individual costs to date, with a forecast for the rest of the work based on current accomplishments. This report compares indicated costs of the individual items with the allowances given in the cost analysis estimate. From this study, the total indicated outcome of the contract can be figured.

Since these reports are prepared for all jobs, Turner management is constantly aware of the overall financial picture. If any important divergences show up, Cost Control must find out why. Sometimes, of course, the estimate might be too optimistic. Sometimes there are field conditions causing the trouble which can't be overcome. In any event, Cost Control will show right away where the difficulty lies.

The construction industry, as ENGINEERING NEWS-RECORD has been pointing out in recent months, is now moving into a period where bidding among contractors will get more and more competitive. The contractors who, like Turner, have an efficient method of knowing their costs, will be the only ones in a position to know where they can cut costs. Naturally, these are the firms that will survive.

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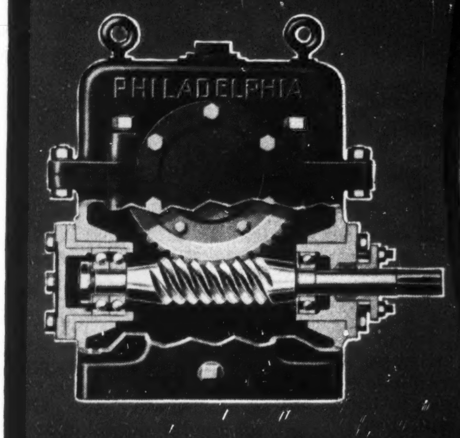

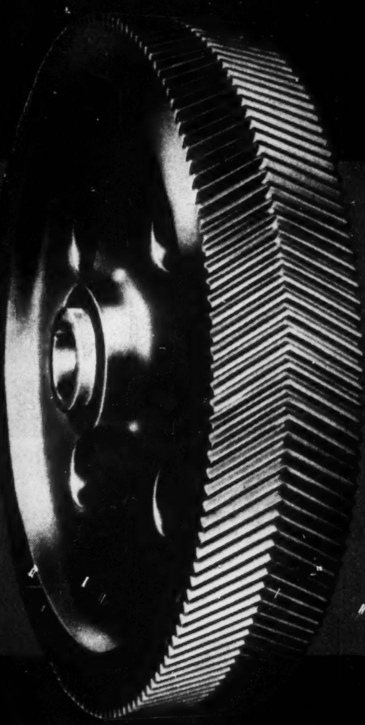

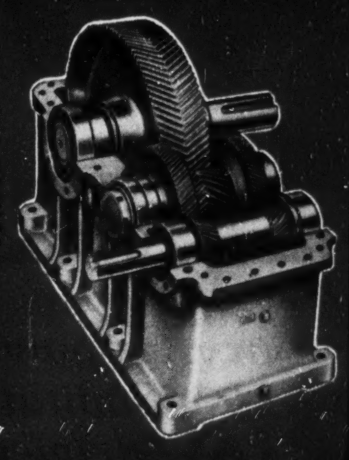

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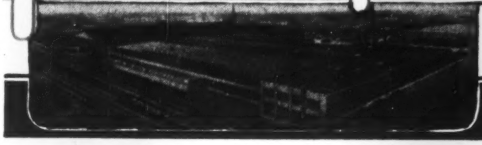

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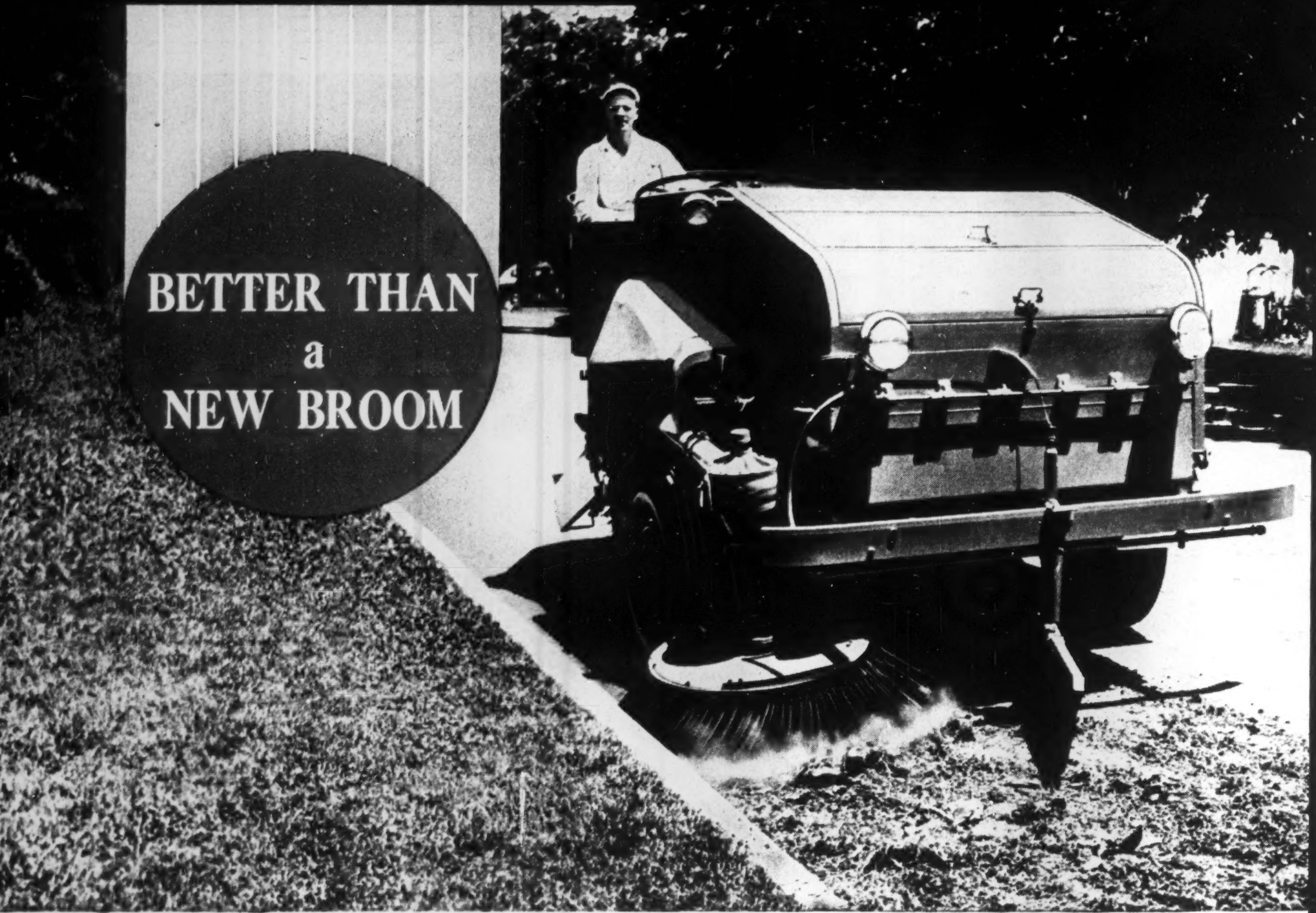

Photo courtesy Wayne Manufacturing Company, Pomona, Calif.

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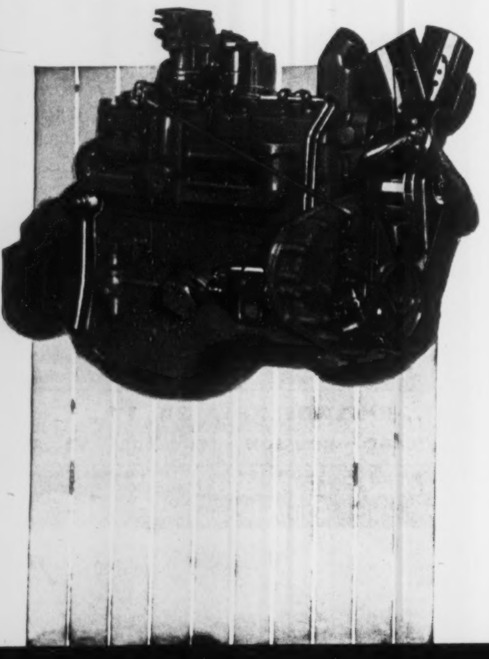

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How school rentals are set under Authority financing

In 1949, the eyes of school officialdom all over the U. S. turned toward Harrisburg as Pennsylvania's new Public School Building Authority began to function. High cost of building construction, liabilities approaching municipal debt limits, and critical need for additional facilities to serve bumper crops of children threatened to burst educational accommodations at the seams.

• **How it was set up**—The SBA (ENR March 16, 1950, p. 36) may build school buildings for local school boards that are unable to finance them.

• It leaves the design of such buildings to the school boards for which it builds, allowing them to choose their own architects, to keep decisions at home as much as possible.

• Rigid inspection is an authority job.

• SBA requires approval of all its projects by the state Department of Public Instruction, which also determines whether a district can afford the facilities.

• The authority will, if necessary, acquire the site, pay the architect's fee and even furnish and equip the structure for the school board.

• Contingency charges are limited to 8%.

• Required rentals amounting to 120% principal and interest requirements on the bonds are charged to a project. These rentals enter a sinking fund, whence interest is paid and from which a fund is established equal to two years' interest on the bonds. The remainder is available for bond redemption. On this basis, a district can amortize its debt in about 32 years.

• **How it works**—Since its organization, SBA has constructed about 30% of all school buildings built in the state. Some $90 million has been expended by the authority on non-prototyped public schools of all classifications.

Upon application by a school board for a new structure, the ability of the applicant to pay for the project is first thoroughly investigated by the Department of Public Instruction. Some of the districts are eliminated as poor risks.

(The authority, therefore, is a down-the-middle organization. The wealthier towns either finance their own construction or establish separate local school authorities. There are many such organizations at present engaged in construction programs.)

With the acceptance of the municipality as a financially responsible organization, plans are prepared.

The authority's main job then is to check the plans for completeness and adherence to minimum state requirements, and to work out the preliminary financial arrangements.

SBA's architectural staff under Claude R. Greiner, chief architect, carry on a continuous examination program, and it is rare that at least one plan is not on deck as soon as they lay aside the other.

• **"Lease" prepared**—A "contractor's lease" is drawn up based upon the architect's cost figures, and the original financing is handled under the terms of this lease until the bids are opened.

If bids are within an acceptable range, a new lease is drawn up on the basis of the firm estimate, but this, too, is a temporary agreement. It is admittedly only an approximation of the cost of the project.

The final, or "permanent lease" goes into effect only after the job has been completed, absolute costs are known and items covering contingencies and change orders have been computed.

• **Finance**—The basis of all leases is the same—40-year maturity of the bonds to be issued. One feature is apparent, in almost all cases: Adjustment from the temporary rent to the permanent rent will be downward.

An example of how the adjustment is made may be seen in the case of a school constructed and equipped at a total cost of $612,997.00. Under the temporary lease, the first year's rent was estimated—and paid—at $35,197.26, but upon completion of all expenditures, it was found that the rent under the terms of the permanent lease would be $34,104.77.

REPRESENTATIVE DATA TABLE

Pa. State Public School Building Authority

Capacity in No. of pupils	Total Cost	Annual Rent	Rent (annual) per pupil
Elementary			
120	$135,729	$8,547.18	$71.22
180	$154,826	$10,032.26	$55.00
180	$156,325	$9,355.35	$51.97
420	$461,268	$27,684.71	$65.92
450	$244,239	$15,446.18	$34.32
Junior High			
484	$1,239,916	$78,879.73	$162.97
528	$1,065,782	$66,818.23	$126.55
High School			
638	$1,511,476	$113,630.01	$178.10
Combination			
702	$724,830	$45,634.03	$65.06
728	$720,130	$43,982.99	$60.42
780	$1,460,929	$98,637.08	$126.45

*Cost figures in most cases include sanitary disposal facilities, paving, grading, seeding and cost of stationary cafeteria equipment.

Since only one year had transpired before the permanent terms were computed, an adjustment of 1 × ($35,197.26 — $34,104.77) = $1,092.49 was necessary. From the second annual rent payment, therefore, $1,092.49 was deducted from the permanent rent amount: $34,104.77 — $1,092.49 = $33,012.28, which was the amount due on the second payment. Thereafter the rents were charged according to the terms of the permanent lease, in this case, $34,104.77 per year.

The average contract cost per pupil for the ten elementary schools during the first four months of 1953 was $891.39, and for 6 high schools awarded during the same period the per-pupil cost was $2,118.89.

The design capacities for class rooms, set by the state, are: 30 pupils per elementary school room, and 22 pupils for secondary school rooms. On the basis of these requirements, from ten school plans pulled at random from the authority files, the annual rents per pupil are as follows:

High and Junior High—$155.87
Mixed High & Elementary—$83.98
Elementary only—$61.03

In the great majority of the projects handled by the authority, the total cost figure includes sanitary waste disposal facilities, usually septic tank and drainage field; paving, grading, seeding and stationary equipment for cafeterias and kitchens.

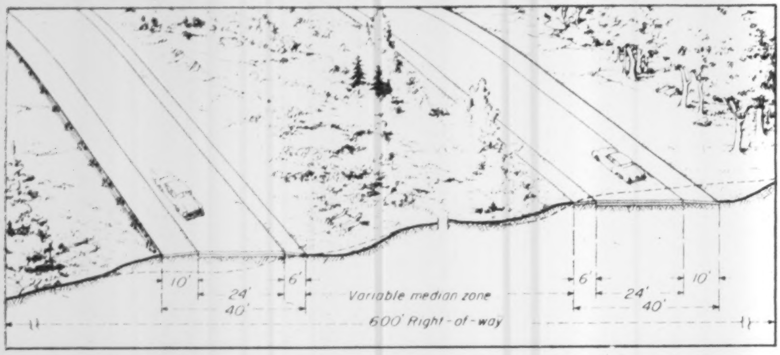
B. J. McCandless, a private architect who has completed seven authority jobs and has three in prospect, says of the organization, "The authority rates 100% at giving the public its full dollar's worth. Chief Bartman has an outstanding faculty for hiring the best man for the job."

"Inspection is thorough, strictly business and in keeping with the performance of the other departments which are as well run as any I've seen in my thirty years of design experience."

Russell C. Bartman, authority chief since its inception, pilots the organization with a lay-it-on-the-line directness reminiscent of his Navy background, and his staff seems to have caught some of the aggressiveness of their boss.

Bartman and his staff fairly bustle with the activity of keeping up with the many jobs under construction. Says he, "Sure we're busy—we've got to see to it that projects handled by our outfit represent the maximum amount of school for every nickel spent."

Is the authority producing? It is—and it has a hundred well-run projects to prove it.



NEW JERSEY'S Garden State Parkway will have a right-of-way normally 600 ft wide except in built-up areas. Emphasis in landscaping is on retaining natural conditions.

Better methods reduce costs on highway landscape work

More machine work and modification of specifications developed in earlier years have kept the cost of highway landscaping on the Garden State Parkway in New Jersey from rising as rapidly as have most other highway costs. Comparisons of current bids to the New Jersey Highway Authority for work on that parkway and to the New Jersey Highway Department for the Palisades Interstate Parkway with bids for landscape work in other years show little increase in many cost items and declines in a few.

These savings are due chiefly to two developments, according to Oliver A. Deakin, engineer of parkway design for the highway authority and former parkway and landscape engineer for the state highway department. First are changes in design standards, such as the use of flatter slopes, which make possible the greater use of machines and a consequent reduction in hand operations. Second are changes in specifications based on experience gained in parkway work done to date.

Construction of the 165-mile Garden State Parkway was begun by the highway department in November, 1946, as a long-range undertaking. Now it is being pushed to completion by the New Jersey Highway Authority, which was set up last year to permit financing the project as a toll facility (ENR Sept. 18, 1952, p.28). Ransford J. Abbott, commissioner of the New Jersey Highway Department, is chairman of the authority, and Harold W. Giffin, former chief of design and construction for the department, is chief engineer for the authority.

• Unusually flat slopes—Noteworthy in the parkway specifications are the flat slopes used on low fills and in shallow cuts, as shown in an accompanying table. These flatter slopes have several advantages beyond aesthetic considerations. They enlarge the area over which soil can be processed by machines, they reduce erosion, and lessen maintenance costs by increasing the amount of mowing that can be done by machine.

All cut and fill slopes are required to have a gradual transition from one slope ratio to the next. Slope transitions are at a rate of one unit of slope ratio per 100 ft along the profile. Slopes are modified where necessary to preserve existing growth.

Other innovations are use of flat slopes for the sides of ditches and limiting the length of ditches between drop inlets to not over 400 ft, generally less. Such short and flat ditches can be grass covered without danger of erosion, because of the small quantity of water carried, thus reducing the amount of more costly paved ditch. Also, flat side slopes present no obstacle to the movement of maintenance equipment over the wide parkway right-of-way and are less of a hazard to vehicles out of control.

SLOPE GRADING STANDARDS ON PARKWAY

Fill		Cut	
Fill height, feet	Slope	Cut depth, feet	Slope
0 to 5	1 on 6	0 to 3	1 on 6
5 to 12	1 on 4	3 to 6	1 on 4
12 to 50	1 on 2	6 to 25	1 on 3
50 up	1 on 1½	25 up	1 on 2

• Less topsoil called for—Experience also has demonstrated that much less borrow topsoil is required than was considered necessary in the past, also that four inches of topsoil is adequate in most locations instead of the six-inch depth specified in the past.

Similarly, for the parkway, the amount of organic matter in acceptable topsoil has been cut from the 4 percent by weight called for in the highway department specifications to 2¾ percent. Where the soil is deficient, the contractor is required to add peat humus. Addition of 125 lb per cu yd is specified for each one percent of deficiency.

In the past, where soil on the job was deficient in organic matter, the more common practice was to import topsoil of satisfactory character. On the parkway, because of the large quantities required around interchanges and grade separation structures, the contractors are encouraged to process the best of the locally available soil. Also, in the southern part of the state, contractors are expected to get peat from nearby marshes to add to the sandy soil. That accounts for the item "Peat humus (wet excavation)" in the accompanying table of cost items.

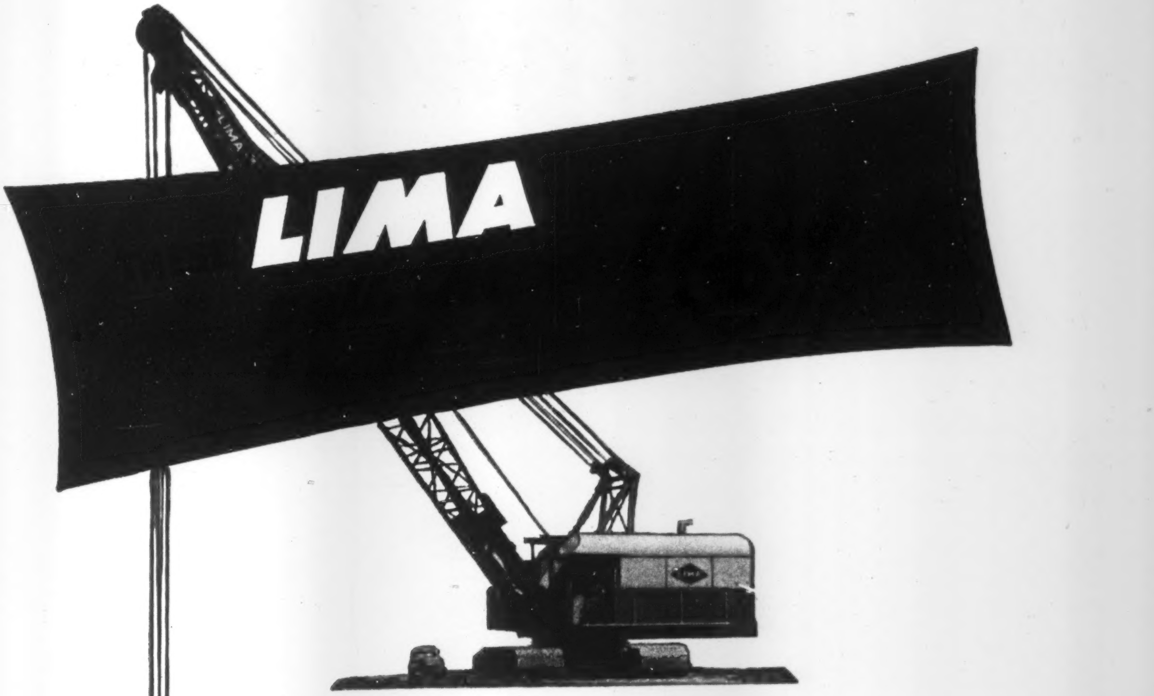
And because of the flat slopes on most parkway areas, much of this processing can be done by machine.

• Seeding and mulching—Seeding requirements also have been modified. On the parkway, the current highway department specification of 200 to 175 lb per acre has been cut to 125 lb. When seeding flat areas, 10 lb of grain are added to the seed mixture. On slopes of 1 on 2 or steeper, 25 lb are added. Oats are used for this purpose during spring seeding, and rye in the fall. Seed mixtures are No. 1 and No. 4 of the New Jersey Agricultural Station, New Brunswick.

Contractors are given the option of spreading seed by hand or by mechanical means, using one of the blower-type spreaders that now are available. These spreaders also can be used for distributing fertilizer and for the mulch and asphalt emulsion used to stabilize slopes until grass roots develop to hold them.

Except in the pine barrens of the southern part of the state, mulch is used at a rate of two tons per acre after seeding all slopes of 1 on 3 or steeper. It is anchored by an emulsion of RC 2 asphalt at a rate of 0.04 to 0.075 gal per sq yd, the higher quantity being applied to slopes over 8 ft in height. An application temperature of 150 deg F is specified for the asphalt emulsion.

In the pine barrens, mulch is ap-



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plied to all seeded areas, flat sections as well as on all slopes.

Practically no sodding is being done as part of the current parkway construction.

• Grass on stabilized shoulders—In the southern part of the state where gravel is available, a type of stabilized shoulder is being put down for the parkway which is designed to encourage development of a grass cover. To produce this, topsoil is added to the gravel, and humus if necessary, to produce a mixture having an organic content of not less than 3 percent nor more than 4 percent by weight. Also added are pulverized limestone and fertilizer.

A special grass mix is specified for these stabilized shoulders as follows:

Kentucky blue grass	25%
Chewings fescue	40%
Red top	20%
White clover	10%
Oats (in spring) or rye	5%

• Trees and shrubs—Every effort is being made to preserve and use existing trees and shrubs on the right-of-way for the parkway, which normally is 600 ft wide except through some of the built-up suburban areas of the northern part of the state. To that end, bids include rates for moving shrubs and trees. Bid prices cover balling and burlapping, also heeling in where trees or shrubs cannot be moved to final location at once.

Much of this moving is being done in the southern part of the state where the native plants include laurel, swamp azaleas, high-bush blueberry and holly. Many unusually fine holly trees have been moved on some of the contracts at reasonable cost to the highway authority.

On the section of parkway built by the highway department before the highway authority was set up to speed completion of the project through toll financing, many trees and shrubs were purchased from nurseries. Now, in order to keep down initial investment, very little of that is being done. Additional planting, especially that designed to blend new structures such as bridges, restaurants, police barracks and maintenance areas into the landscape will be done after all other contracts are well under way. Much of the landscape planting will be completed after the parkway has been placed in operation.

• Screen planting in median zone—Except in the suburban areas of north Jersey where right-of-way restrictions limit the width of the median zone, shrubs are to be planted in the median zone wherever they are needed to form a screen against headlights in the opposing lanes. For many miles in south Jersey no such screening will be required as opposing lanes will be widely separated and there is natural growth of trees and shrubs in the area between north and southbound lanes.

Near the north end where narrow medians must be built, two methods of screening are proposed. The minimum-width of median in that area is 4 ft. Those medians are to be equipped with 8-in. high barrier curbs and there is to be a 4-ft high farm-type steel-wire fence in the center of the median supported by cedar posts.

To convert this fence into a screen, vines of Hall's honeysuckle are to be planted at intervals of 1½ ft. This is a type of honeysuckle that is nearly evergreen in New Jersey and so will provide a screen in winter as well as summer. However, as honeysuckle is slow in getting started, plantings of the China fleece vine (silver lace vines) are to be made initially as it is a fast grower.

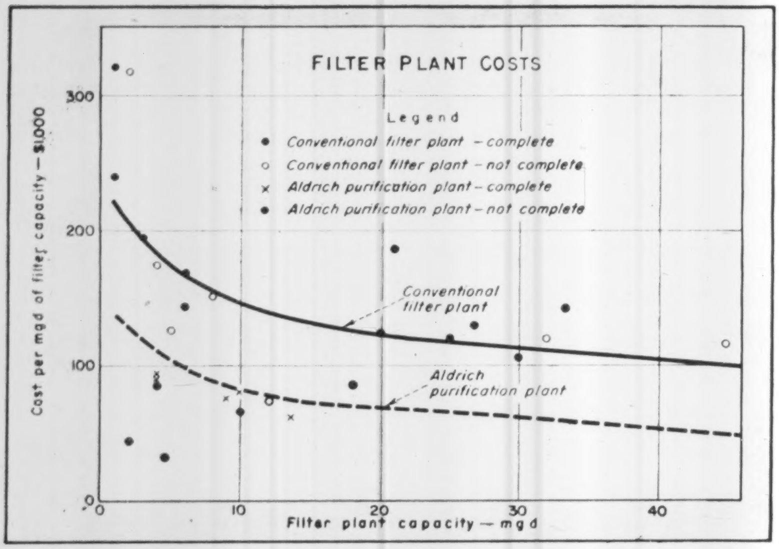
The 16-ft wide medians have no barrier curbs. They are relatively flat, being made up of a 3-ft wide shoulders and 10-ft of grassed area sloping toward the center where there is a back-to-back low timber guard rail mounted on 8x8-in. concrete posts. Here the screen plans still are tentative. Present plans call for some form of wire above the guard rail with vine planting.

Vines are considered preferable to hedges because of the cost of keeping hedges trimmed.

HIGHWAY LANDSCAPE COSTS

Type of Work	Units	Cost
Stripping top soil, 6-in. depth	acre	$200–$400[1]
Excavation, earth	cu yd	0.60–1.25
Excavation, rock	cu yd	8.00–10.00
Excavation, borrow	cu yd	0.60– 1.50
Excavation, wet	cu yd	0.85– 2.00
Peat humus	ton	22.00
Peat humus, wet excavation[2]	cu yd	2.00– 5.00[3]
Topsoil (imported)	cu yd	3.00– 4.00
Topsoiling,[4] 4-in.	sq yd	0.40– 0.55
Topsoiling,[4] 6-in.	sq yd	0.60– 0.75
Preparation of existing soil	acre	150–250
Fertilizing and seeding	sq yd	0.08– 0.12
Mulching (hay)	sq yd	0.06– 0.10
Sodding	sq yd	1.50– 2.25
Selective thinning of existing trees	acre	200–400
Trimming existing trees, 6-in. caliper	each	5.00
Trimming existing trees, 12-in. caliper	each	10.00
Trimming existing trees, 20-in. caliper	each	18.50
Trimming existing trees, 30-in. caliper	each	30.00
Trimming existing trees, 36-in. caliper	each	40.00
Tree removal, 6–12-in. caliper	each	20–30
Tree removal, 12–18-in. caliper	each	35–50
Tree removal, 18–24-in. caliper	each	50–65
Tree removal, 24–30-in. caliper	each	70–90
Tree removal, 30–36-in. caliper	each	100–125
Moving small trees,[5] 4– 6-ft high	each	6.00– 8.00
Moving small trees,[5] 6– 8-ft high	each	20.00–25.00
Moving small trees,[5] 8–10-ft high	each	20.00–30.00
Moving small trees,[5] 10–12-ft high	each	25.00–35.00
Moving shrubs,[6] 1½–3-ft high	each	3.50– 4.00
Moving shrubs,[6] 3 –5-ft high	each	5.00– 7.00
Dry rubble wells around trees	cu yd	50.00–60.00
Rough-cut timber guard rail (low)[7]	ft	2.80– 3.50
Rough-cut timber low guard rail with bumper log[8]	ft	5.50– 6.50
Mowing grass	acre	10.00–20.00
Grouted rubble gutter	sq yd	8.00– 9.00
Granite block slope protection	sq yd	7.00– 9.00
Stabilized turf shoulders (6-in. thick), gravel[9]	sq yd	0.75– 0.95
Stabilized turf shoulders (6-in. thick), stone	sq yd	1.30– 1.50

[1] Price range depends on amount of acreage to be stripped.
[2] In southern New Jersey, contractors can obtain peat from nearby marshes with their own forces.
[3] This top price probably is a result of unbalanced bidding.
[4] The price for topsoiling includes furnishing and placing topsoil, finish grading, liming, fertilizing and seeding.
[5] Tree moving price includes balling and burlapping, heeling in moved trees for storage, also final setting in permanent location.
[6] Shrub moving costs cover same as tree moving.
[7] Timber guard is 6 x 10 in. mounted on precast concrete posts.
[8] Bumper type rail includes 10-in. log wheel bumper treated with Wolman Salts and 6 x 10-in. rough-sawn timber guard rail.
[9] Grade A road gravel and soil, limed, fertilized and seeded (see text).



Aldrich water purification unit costs compared with conventional filter plants

The Aldrich purification unit, now with seven installations completed or under way, is realizing construction cost savings of $50,000 to $80,000 per mgd capacity under the price of conventional purification plants. This is the conclusion of E. H. Aldrich, vice-president and chief engineer of American Water Works Service Co. Mr. Aldrich has applied for a patent for the design; his company is, so far, the only user of it.

The purification unit is in effect a unit plant, a circular steel tank incorporating chemical mixing, coagulation, settling and filtration (see ENR Jan. 1, p33). First installation was in 1950 in Alexandria, Va., where low-cost, easy operation is claimed in addition to relatively low construction cost.

Mr. Aldrich believes the savings in first cost indicated by the accompanying data are typical. He explains that in drawing the dashed line on the graph, actual costs his firm is experiencing were increased from 10 to 20%, in the realization that quantity purchasing and other economies may be saving American Water Works Service Co. that much.

(American Water Works Co., and Northeastern Water Company, for whom American Water Works Service Co. builds and operates, are owners of 111 water systems in the U. S.)

Cost and capacity data on the 19 recently designed conventional waterworks with which the Aldrich units are compared come from published data in most cases, and in others from the consulting engineers involved. Costs shown generally cover complete filter plants including mixing, settling, filtration, chemical treatment and storage, wash water tank, clear well storage and high service pumping equipment and piping–except as the notes indicate.

Brief descriptions of facilities involved follow the cost and capacity data on the seven Aldrich plants listed in the table at the left, below.

Aldrich purification plant costs

Location	Year	Filter capacity mgd	Total cost $	Cost per mgd Filter Capacity $
Monmouth, N. J.	1953	2.0	90,000	45,000
Ashtabula, Ohio	1953	4.0	350,000	87,500
Canonsburg, Pa	1953	4.0	366,000	91,500
Greenwich, Conn	1953	4.0	370,000	92,500
Chattanooga, Tenn.	1951	10.0	680,000	68,000
Westmoreland, Pa	1952	10.0	825,000	82,500
Alexandria, Va	1950	9.0	705,000	78,500
Alexandria, Va	1952	4.5	145,000	32,300
Total		13.5	850,000	63,000 Avg.

Monmouth, N. J. — Iron removal plant including aeration, mechanical mixing and flocculation, chemical equipment and storage, filtration at 3.0 gal per sq ft per min. Wash water tank not provided. No pump station structures required.
Ashtabula, Ohio — Addition to existing 6.0 mgd plant, high service pumping not included.
Canonsburg, Pa. — Softening and automatic filter control.
Greenwich, Conn. — Filter plant complete.
Chattanooga, Tenn. — High service pumping not included.
Westmoreland, Pa. — Includes automatic filter control.
Alexandria, Va. — Both first plant and addition include automatic filter control. No chemical equipment or storage in addition.

Conventional filter plant costs

Location	Year	Filter capacity mgd	Total cost or bid $	Cost per mgd filter capacity $
Graham, N. C	1952	1.0	320,000	320,000
Paintsville, Ky	1950	1.0	210,000	240,000
Groton, Conn	1949	2.0	638,000	319,000
Northampton, Pa	1947	3.0	585,000	195,000[1]
Ashtabula, Ohio	1952	4.0	700,000	175,000[2,5]
E. St. Louis, Ill	1950	5.0	630,000	126,000[3]
Logansport, Ind	1953	6.0	874,000	145,500
Minot, N. D	1952	6.0	1,001,300	169,000[4]
Winston-Salem, N. C.	1949	8.0	1,237,000	154,500
Levittown, Pa	1953	8.0	1,263,000	157,500
Cedar Rapids, Iowa	1949	12.0	847,000	70,500[1,2]
Chester, Pa	1948	18.0	1,604,000	89,000
Allentown, Pa	1951	20.0	2,490,000	124,500
Austin, Tex	1952	25.0	3,000,000	120,000
Miami, Fla	1951	26.7	3,485,000	130,000
Oklahoma City, Okla.	1945	30.0	3,182,000	107,000
Niagara Falls, N. Y.	1951	32.0	3,864,000	120,000[2]
Houston, Tex	1952	33.3	4,700,000	141,000
Fort Worth, Tex	1952	45.0	4,890,000	109,000[2]
Wilmington, Del	1952	16.0	3,000,000	187,000

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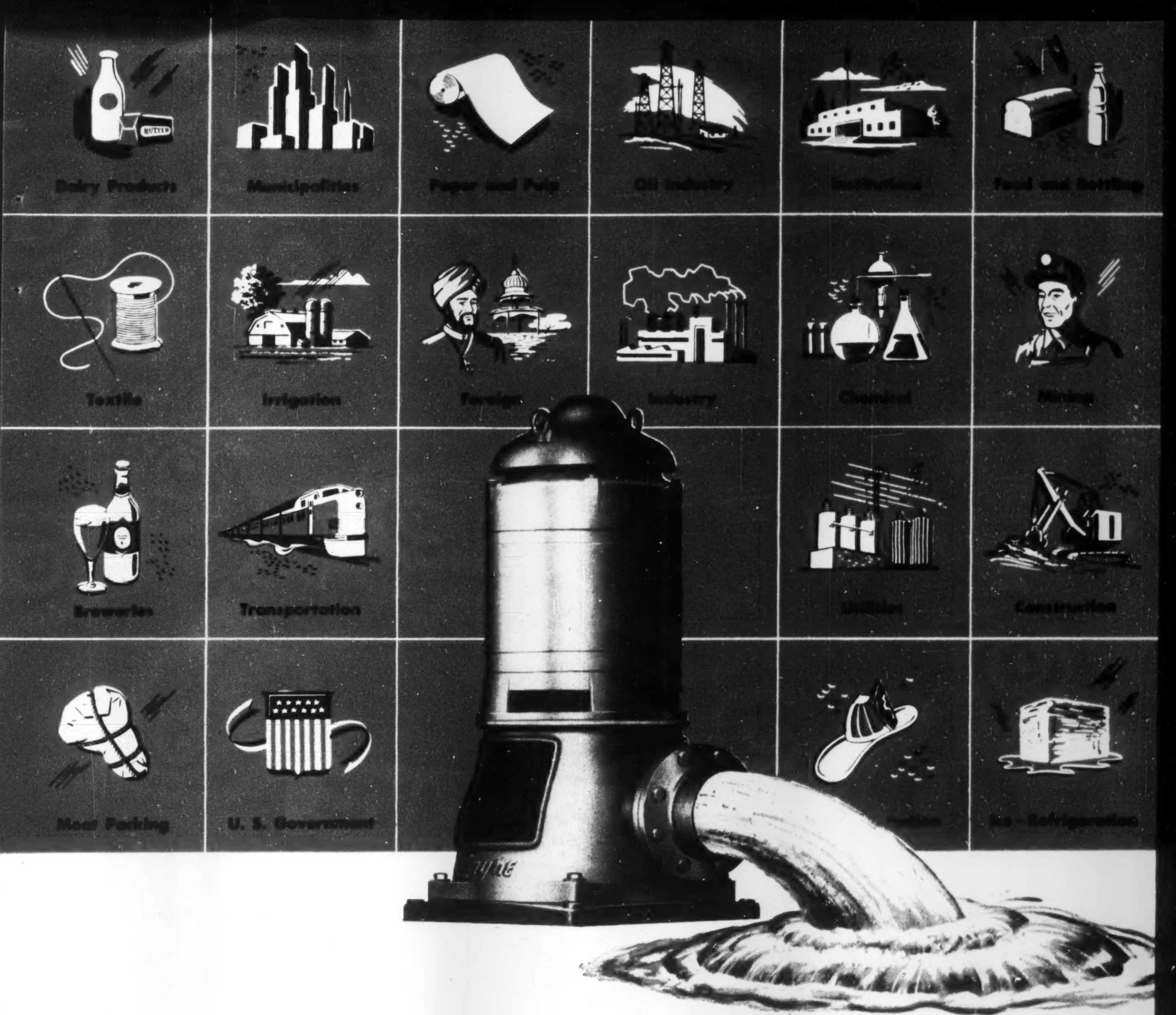
1. includes softening 2. includes no pumping equipment 3. no settling basins, basins existed 4. includes intake and pumps 5. not constructed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Municipalities
Paper and Pulp
Oil Industry
Institutions
Food and Bottling
Textile
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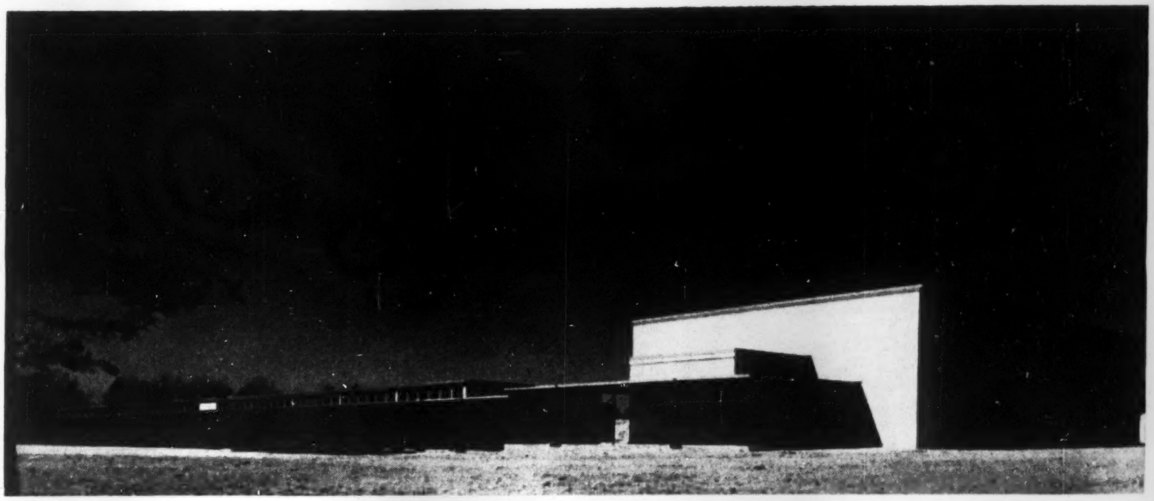

JEFFREY'S GROVE SCHOOL in Wake County, N. C., was built for $8.52 per sq ft. It is of wall-bearing construction, with a roof built of hollow precast concrete units. Floor is a slab on ground. Design was by Deitrick & Knight, architects, Raleigh.

How one state keeps school costs down

In North Carolina, public schools are being constructed at costs as low as $6.50 per sq ft of floor area or $400 per pupil. Even its most expensive schools don't exceed $11.50 per sq ft (see table below). In contrast, in many other parts of the country, school costs run from $12 per sq ft up.

Yet, architecturally and structurally, North Carolina schools are built to high standards.

Nearly all the recently built schools in that state are one story high. Structural framing is steel or reinforced concrete, though frequently the exterior walls are load-bearing. Outer walls generally are built of brick and concrete block, inner walls of concrete block. Inner faces of the unplastered walls are painted. Floors are finished with asphalt and quarry tile. Lighting usually is provided with fluorescent lamps. And heating is accomplished with convectors.

• **Facilities provided**—Adequate facilities are incorporated to meet educational needs. The Sunset Park elementary school in Wilmington, for example, contains 19 classrooms, an administrative suite, clinic, lunchroom and kitchen, and a heating plant. Cherry Point elementary school

CONSTRUCTION COSTS OF NORTH CAROLINA SCHOOLS

School	City or County	Date of Bidding	Gen'l Contr.	Heat'g	Plumb'g	Electr.	Arch. Fee	Total Cost	Pupils	Cost per Pupil	Sq Ft	Cost per Sq Ft
Elementary Schools												
Long Hill*........	Cumberland	1/24/50	$15,000	$1,220	......	$700	$1,000	$17,290	60	$299	1,834	$9.85
Long Hill Addition	Cumberland	11/12/52	43,420	6,425	$3,875	2,177	3,354	59,251	120	494	6,593	8.99
Mt. Olive.........	Wayne	8/18/50	192,300	23,915	15,793	8,290	12,014	252,312	630	401	36,233	6.96
Faison............	Duplin	8/22/50	102,000	11,590	6,540	3,490	6,181	129,801	250	519	17,225	7.52
Sherwood-Bates....	Raleigh	3/16/50	254,800	17,445	16,595	13,888	......	....	.....	.....	....	.....
Sunset Park........	New Hanover	9/ 5/50	....	......	......	......	......	322,670	300	1,076	39,350	8.20
Jeffrey's Grove....	Wake	Fall, 1950	58,937	12,860	5,400	3,232	......	80,429	.....	.....	9,439	8.52
Double Oaks......	Charlotte	8/16/51	320,787	37,787	21,347	18,247	23,890	422,058	331	1,275	36,754	11.48
Cherry Point.......	Craven	1/14/52	....	......	......	......	......	370,796	725	511	48,470	7.65
Jeffrey's Grove Auditorium......	Wake	3/ 6/52	39,831	......	......	......	......	56,295	.....	.....	5,624	†10.00
Clyde A. Erwin....	Onslow	9/ 5/52	432,854	57,765	23,500	29,469	35,500	579,088	750	772	57,970	10.00
Cedar Grove......	Nash	3/ 3/53	101,980	9,935	4,928	4,637	6,074	127,553	270	472	19,348	6.50
Secondary Schools												
Winecoff High.....	Cabarrus	11/ 9/49	164,029	12,700	15,237	9,460	10,071	211,497	300	705	24,110	8.75
Wake Co. Sr.-Jr. High...........	Raleigh	9/26/51	....	......	......	......	......	1,207,407	1,000	1,207	117,224	10.30
Randleman High....	Randolph	12/20/51	143,156	15,929	13,875	17,829	9,539	200,328	210	954	27,900	7.30
North Davidson High	Davidson	2/ 7/52	....	......	......	......	......	573,330	450	1,275	64,464	8.90
Williston High.....	New Hanover	11/ 5/52	535,000	68,800	25,650	48,617	40,684	718,751	600	1,198	70,938	10.13
New Bern High....	New Bern City	11/25/52	561,797	69,485	26,684	58,893	43,012	759,871	700	1,086	89,406	8.50
New Hanover Utility Bldg...........	Wilmington	3/24/53	812,610	76,600	33,400	93,860	50,823	1,067,293	450	2,372	105,700	10.10

* 2-classroom addition.

† $0.52 per cu ft for 107,908 cu ft.

SHERWOOD-BATES SCHOOL in Raleigh is lighted by flush fluorescent fixtures.

is composed of 24 classrooms, a library, administrative suite, clinic, auditorium, lunchroom and kitchen, and heating plant. Clyde A. Erwin elementary school consists of 25 classrooms, library, health room, teacher's room, offices, storage rooms, toilets, lunchroom and kitchen, a multipurpose room for assembly and physical education, and auxiliary rooms.

High-school facilities are more elaborate. They offer, in addition to ordinary classrooms, home economics rooms, science rooms, physical education facilities, lunchrooms and kitchens, auditoriums, music rooms, libraries, art rooms, clinics, administrative suites, miscellaneous activity rooms, shops, drafting rooms and laboratories.

Though not all these facilities are provided by any one school, a large percentage is. New Bern High School, in New Bern City, for example, consists of 27 classrooms, a library, auditorium, band room, commercial rooms, health rooms, teachers' rooms, distributive education room, gymnasium, lunchroom and kitchen, five laboratories, homemaking rooms, shop, drafting room and several auxiliary rooms.

• State checks plans—One of the major reasons why costs are kept down in North Carolina is that the state, paying nearly 90% of school costs, closely scrutinizes all expenditures for school construction.

The watchdog agency is the Division of School Planning of the state's Department of Public Instruction. It appraises plans and specifications prepared by architects employed by the local school authorities (architects are required for construction amounting to more than $20,000). It passes on new sites. It inspects all construction. And on request, it provides consulting service on structural problems in existing buildings.

Currently, the division is staffed with 14 persons—John L. Cameron, director; William P. Duff, Jr., assistant director; two architects, two engineers, two educational supervisors, one architectural draftsman, four secretaries and one bookkeeper.

• Minimum standards set—As a guide for architects, school officials and teachers, this agency has made available a booklet, "School Design," which expresses the thinking of the division on the quality and type of facilities that should be incorporated in schools. Some of the recommendations for minimum standards are given here in tables.

However, the division does not intend to standardize design: "Although there may be a tendency toward stultification of design originality where the approval of a central agency is required, the architects may be assured that, in the case of North Carolina schools, they are encouraged to design buildings expressive of their own thinking, yet conforming to the practices established by the several state services," the booklet comforts architects. "Uniformity of design is not a goal to be compared with the virtues of individuality and imagination. The architect is invited to vary from previously acceptable designs in a continuous effort to improve subsequent projects."

Plans must comply with the North Carolina Building Code, the National Electrical Code and the American Society of Heating and Ventilating Engineers code. They must also meet the minimum design standards of the Department of Public Instruction and the Rules and Regulations of the State Board of Education. Furthermore, they must be approved by the North Carolina Commissioner of Insurance. The division does not issue stock plans but does prepare suggestive sketches to aid architects.

• School financing—Under the watchful eye of this agency, the state has spent nearly $50 million for school construction in the last two or three years. In 1949, the people approved a $25-million bond issue and the state legislature appropriated another $25 million from surplus funds for school construction. The first $25 million was divided equally among the state's 100 counties, and the second was allocated in proportion to the average daily enrollment of the

Recommendations for Elementary School and High School Classrooms

Size: Grades 1 to 3—950 sq ft or more
Grades 4 to 6—800 sq ft or more
Grades 7 to 12—750 sq ft or more

Storage: For teacher, a compartment with lock—min. 5 to 6 in. high, 3 ft wide, 1 ft 8 in. deep—pole for hanging garments with shelves above—shelving for teaching aids and supplies. For pupils, elementary grades, garment storage, enclosed but ventilated, with pole for hangers, heights varying with grades; also a 14-in. wide, 10-in. high by 14-in. deep supply compartment with doors, for each pupil. For high school students, garment and equipment storage in hall lockers.

Work area: For elementary school, at least 6 lin ft of work counter, 2 ft deep, including a counter-type sink; storage cabinets with doors and shelving under the counter. For junior and senior high schools, work counter and sink desirable for classrooms that may be used for drawing and art classes.

Equipment: Chalkboard—16 lin ft, 3 ft 6 in. wide. Tackboard—16 lin ft or more, including at least one piece 8 x 3 ft. Outlets—two or more on opposite sides or ends of the room, one preferably in the work area. Shelving—For book storage and displays. Blackout—Provisions for darkening room to permit use of audio-visual equipment.

Grades	**4 to 6**	**7 to 8**	**9 to 12**
	Heights in inches		
Chalk rails	28 to 30	29 to 32	33 to 36
Work Counter	30 to 33	33 to 36	33 to 36
Clothes pole	44 to 48	48 to 52	

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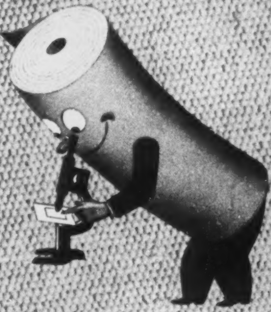

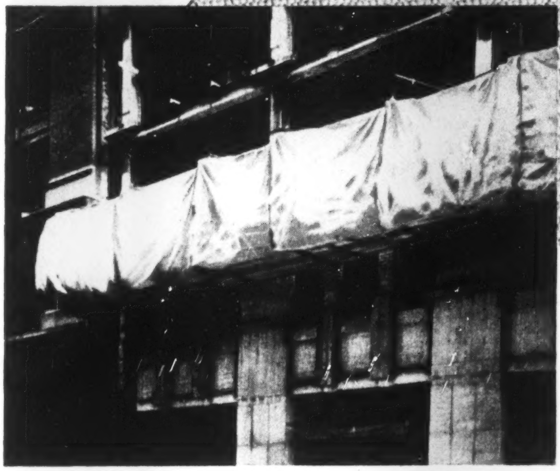

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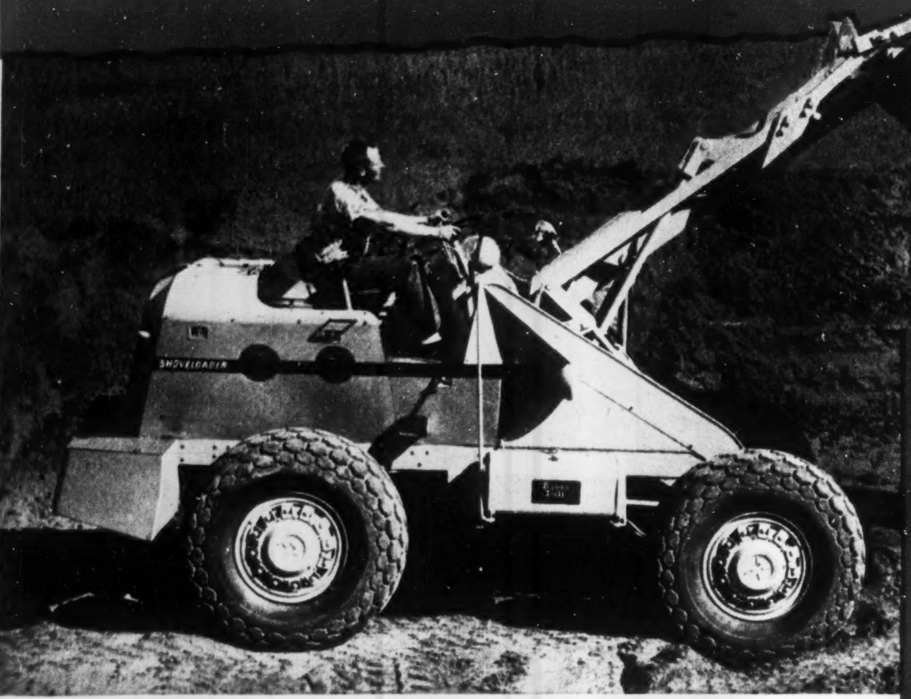

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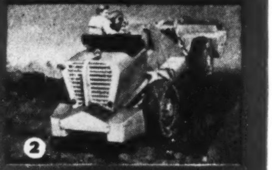
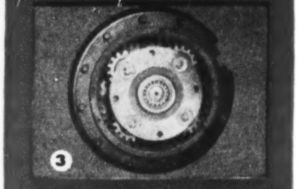


2. Positive 4-wheel, 5-speed transmission, and 100-inch wheelbase enable unit to negotiate steep earth banks, ramps or obstructions. Hydraulic power steer. Front or rear wheel steer optional. 4-wheel steer available.



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schools in the school year 1947-48. Counties distributed the funds to local administrative units generally in accordance with enrollments.

In addition, local units have spent $130 million for school construction since 1949. Of this total, $90 million was raised by bonds and $40 million by taxes. Funds were also supplied by the federal government under Public Law 815 to help relieve overcrowding caused by government activities in some areas.

The state also assists local administrative units through its Literary Fund. This money is furnished on a revolving loan basis, whereby the local administrative unit uses the credit of the state.

The state's share of the cost of plant operation and maintenance including janitorial expenses, fuel, electricity, telephone, paid out of the state's General Fund, is distributed in proportion to the number of teachers in the administrative unit.

Local units raise money for schools through taxes and bond sales. Bonds may be issued without an election, to meet debts up to two-thirds of the value of the bonds retired the previous year. When a bond election is necessary, it must be approved by the state's Local Government Commission before the people vote on it. Indebtedness of a county is limited by statute to 5% of its assessed valuation. However, if a county has assumed responsibility for the assets and debts of all its school districts, the limitation is raised to 8% of the assessed valuation.

The General Assembly recently authorized a bond election for $50 million for capital outlay purposes for schools. This election was held Oct. 3; the results will be published in ENR as soon as available.

Recommendations for Facilities for Physical Education

Shower room fixtures

	Boys					Girls				
Size of group	20	30	40	50	60	20	30	40	50	60
Shower heads	6	7	8	10	12	6	8	10	12	14
Lavatories	2	2	3	3	4	2	2	3	3	4
Drink fountains	1	1	1	2	2	1	1	1	2	2
Urinals	1	2	3	3	4					

Shower Room: For junior or high school, minimum of 6 shower heads in gang showers. For girls, at least three shower heads may be in private shower and dressing combinations. Minimum width of gang shower room with heads on opposite walls—9 ft; heads on one wall only 6 ft. Distance between adjacent shower heads—3 ft 6 in. Height of shower heads—6 ft for boys, 4 ft 6 in. for girls.

Drying and Toweling Area: Size nearly equal to that of shower room.

Dressing Room Light and Ventilation: Operable windows, area equal to 10% of floor area; window stool height 5 ft 6 in. or more.

Indoor Playing Area: For elementary schools, 40 x 70 ft, ceiling 16 to 18 ft. For junior high schools, basketball courts 42 ft x 72 ft 8 in., ceiling 18 to 20 ft. For high schools, basketball courts 50 x 84 ft, ceiling 20 to 22 ft.

Playing Area Natural Lighting: Continuous windows, preferably on side walls only; window stools at least 12 ft above the floor; sun control or glare-reducing glass on sunny sides.

Finishes: Wood floor, preferably maple; Walls—smooth non-abrasive surfaces for a height of 6 ft 8 in. to 7 ft.

Recommendations for Toilet Rooms

Number of Fixtures Required

Total Students		200	300	400	500	600	700	800
Approx. No. of Classrooms		7	10	13	17	20	23	27
Drinking Fountains		3	4	6	7	8	10	11
Elementary Schools—Lavatories		3	3	4	5	6	7	8
Toilets	Girls	4	5	7	8	10	12	14
	Boys	2	3	4	4	5	6	7
	Urinals	3	5	7	8	10	12	13
High Schools—Lavatories		3	3	4	5	6	7	8
Toilets	Girls	3	4	5	6	7	8	9
	Boys	2	3	3	4	4	5	5
	Urinals	3	5	7	8	10	12	13

Heights of Fixtures—In.

Grades	1 to 3	4 to 6	7 to 9	10 to 12
Lavatory	22 to 24	25 to 27	27 to 30	29 to 32
Drinking Fountain	24 to 26	28 to 30	30 to 32	33 to 35
Toilet Bowl	10	13	13	16

Minimum Width of Room: 10 ft if fixtures are located on both sides of room.

Window Stool Height: 4 ft or more above floor.

Operable Window Area: 10% of floor area unless mechanical ventilation is provided.

Miscellaneous Recommendations

Sloping Site: 0 to 10%—Place wings of the building parallel to contours, using shallow rooms where the slope exceeds 7%.

10 to 15%—Place wings at right angles to the contours, using a split level in the length of the building.

15 to 20%—Place wings parallel to the contours using a split level in building cross section.

Corridors: 9 ft min. clear width when with corridor lockers, 8 ft without.

Library: Size—25 to 30 sq ft for each seating space:

Enrollment	200	400	600	800	1,000
Seating	50	70	80	90	100

Adjustable open shelving—Max. height 6 ft in elementary schools, 7 ft in high schools; low shelving 36 to 48 in. high beneath glass partitions, windows and to separate special areas. Depth of shelves—Standard 8 in.; oversize and reference, 10 to 12 in.; magazines and newspapers, 12 to 15 in.

Science Room: Flexible class-laboratory space for 20 to 30 students, 30 sq ft min. per student; 12 to 20 lin ft each of chalkboard and tackboard; electric outlets providing 2 to 3 kw; provision for picture projection; movable tables for each two students; demonstration table; germination or plant bed 2 ft by 6 to 8 ft; book shelving; display cabinet 24 in. deep with spotlights and supply of water, gas and electricity; storage for dangerous and expensive equipment; 100 to 150 lin ft of open shelving, 12 to 16 in. deep; 15 to 30 tote trays, 18 in. wide, 24 in. long by 10 in. deep ft-c at desk and table heights: Classrooms—30; Drafting, sewing, typing—50; Shops—30; Offices—30; Libraries—30 to 50; Auditorium—10; Lunchroom—10; Gymnasium—20; Kitchen—10; Corridors—5 to 10; Toilets—10.

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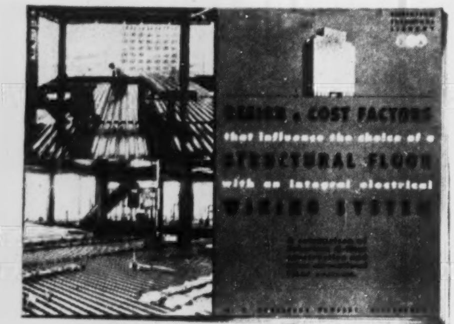

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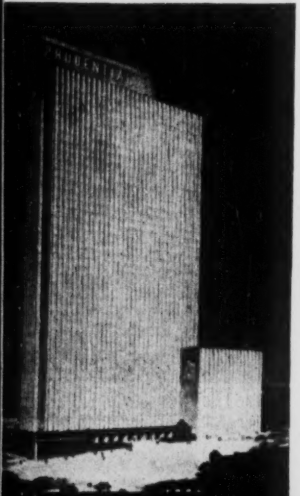
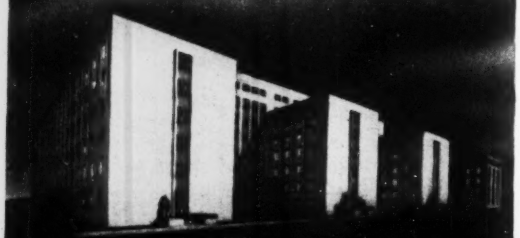
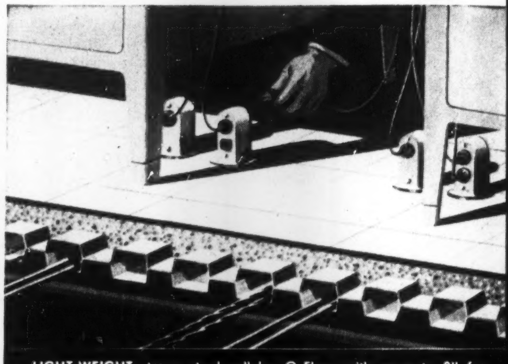
Smithey & Boynton, Arch.
B. F. Parrot & Co., Contr.



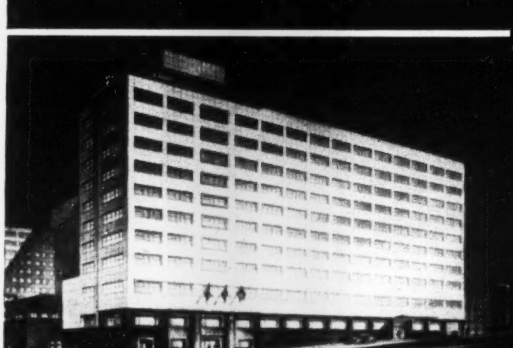
CHICAGO—PRUDENTIAL INSURANCE CO. OF AMERICA
Naess & Murphy, Architect & Engineer
Geo. A. Fuller Co., General Contractor



NASHVILLE—TENNESSEE STATE OFFICE BUILDING
Hart & McBryde, Architects; A. Jessup, Structural Engineer;
Creighton & MacDonald, Builders



LIGHT-WEIGHT strong steel cellular Q-Floor with concrete fill for leveling purpose only. Electric outlets become available over every 6 inch area of the floor's exposed surface.



MONTREAL—INTERNATIONAL AVIATION BUILDING
Office of Chief Architect of Canadian National Railways, Architect;
Anglin-Norcross, Ltd., Contractors

dollar with Robertson Q-Floor

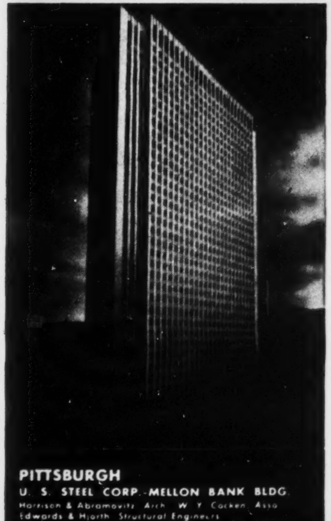
TWO MEN can lay fifty sq. feet of Q-Floor in one minute, providing an immediate safe platform for work and storage. Strength plus light weight allows savings in structural members and footings.

LOS ANGELES—3450 WILSHIRE BOULEVARD BUILDINGS
Cloud Beelman, Architect, Brandow & Johnston, Structural Engineers,
C. L. Peck, Contractor

SEATTLE—FEDERAL RESERVE BANK OF SAN FRANCISCO
Naramore, Bain, Brady & Johanson, Architects, W. H. Witt Co., Structural Engineers
Kuney Johnson Co., Contractor

NEW YORK
LEVER HOUSE
Skidmore, Owings & Merrill, Architects
Weiskopf & Pickworth, Structural Engineers
Geo. A. Fuller Co., Contractor

TORONTO
BANK OF NOVA SCOTIA
Mathers & Haldenby, Architects,
Beck & Eadie, Associate Architects,
J. L. E. Price & Co., Ltd., Contractor



PITTSBURGH
U. S. STEEL CORP.-MELLON BANK BLDG.
Harrison & Abramovitz, Arch. W. Y. Cocken, Asso.
Edwards & Hjorth, Structural Engineers
Turner Construction Co., Builder

HONOLULU—HAWAIIAN LIFE INSURANCE CO., LTD.
Vladimir Ossipoff, Architect,
E. E. Black, Ltd., Contractor

DES MOINES—IOWA STATE OFFICE BUILDING
Tinsley, Higgins & Lighter, Architects & Engineers
Kucharo Construction Co. & Asso., Contractors

HOUSTON—SAKOWITZ BROS. STORE
A. C. Finn, Architect, R. J. Cummins, Engineer
Tellepsen Construction Co., Contractor

H. H. Robertson Company

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Firm ______________________________

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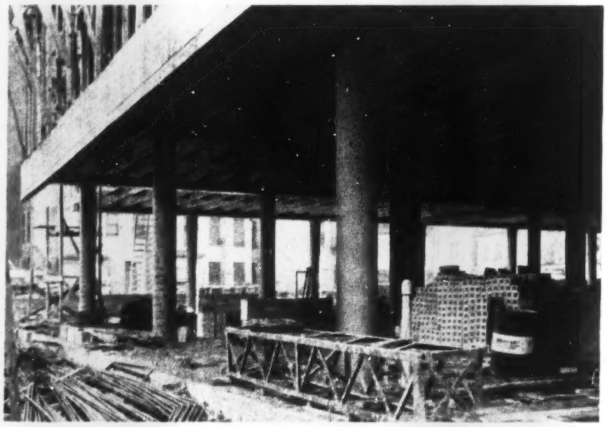

ABOVE—Public Library, Cincinnati. F. W. Garber—Samuel Hannaford & Sons, Architects. Frank Messer & Sons, Contractor. Geo. Stille, photo.

Low cost SONOVOID fibre tubes create voids, thereby lightening the concrete slab for economy and ease of handling. These voids displace the dead-weight concrete near the neutral axis which does little or no work. SONOVOID saves concrete and reinforcing steel. Sizes 2" to 36.9" O.D., up to 24' long, or longer. Can be sawed to lengths on the job.

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14 SOUTH PARK STREET
GARWOOD, N. J.
BRANTFORD, ONT.
AKRON, IND.

UNIT PRICES BID BY CONTRACTORS

FIFTEEN-FLOOR OFFICE BUILDING to house home offices of State Insurance Fund. The building will be completely air-conditioned.

Office building, New York

An office building, occupying a square block in downtown New York, will be erected for the new home offices of the State Insurance Fund. Six contracts totaling $5,209,578 have been awarded, four to the low bidders and two to the second low. They provide for general construction; heating, ventilating, and air-conditioning; electrical work; plumbing; elevator installation; and moving stair installation. The demolition and foundation contracts, totaling $394,420, were previously awarded and work is now under way.

Charles H. Sells is the consulting engineer and Lorimer Rich & Associates, the architects. Seelye, Stevenson, Value & Knecht were consulting engineers on the mechanical design and Krey & Hunt on the heating, plumbing, electrical work, air conditioning, and elevators.

The building will have fifteen floors plus two cellars and a cooling tower adding up to a total square foot area of 314,784, or approximately 17,500 sq ft per floor. Of the 4,001,470 cu ft total, the cooling tower contains about 152,000 cu ft; the fifteen floors, 3,243,050 cu ft; and the two cellars, 606,420 cu ft. Approximate costs per sq ft are $17.80 and per cu ft, $1.40.

Bricklayers and structural iron workers are receiving $3.55 per hr; carpenters and electricians, $3.30 per hr; laborers, $2.40 per hr; and truck drivers, $2.00 per hr. The project will take eleven months.

Bidders include:

General construction

1	Joseph P. Blitz Co	$2,778,900
2C	Cauldwell-Wingate Co	2,787,000
14	William A. Berbusse, Jr., New York, N. Y.	3,095,491

Alternate 1—substitute cellocrete block for marble face blocks in the stair wells—subsequent painting cost would probably absorb this saving in about 15 years.
Alternate 2—substitute perforated mineral acoustic tile for metal pan acoustic tile included in base bids—it is difficult to clean mineral tile.
Alternate 3,4,5,6—finish ceilings, floors & walls in south end of first floor which was left unfinished in base bid.
Alternate 7—substitute marble partitions for metal partitions specified in the base bd.
Alternate 8—substitute tile wainscotting 4-ft,6-in high with plaster walls above for tile walls in toilets—subsequent painting makes the economy questionable.
Alternate 9—substitute a different type of aluminum window from the 180° pivot window specified in base bid.
Alternate 10—omit ejector pit and sump pit in the sub-cellar.

	1	2 C
Alternate 1	−$25,500	−$25,000
Alternate 2	−47,500	−35,000
Alternate 3	+ 4,000	+ 4,500
	+ 3,125	+ 3,500
Alternate 4	+ 1,425	+ 1,500
Alternate 5	+ 1,450	+ 1,500
Alternate 6	+ 900	+ 1,000
Alternate 7	+19,600	+25,000
Alternate 8	−11,500	− 7,000
Alternate 9	+22,500	− 5,000
Alternate 10	− 1,500	− 2,000

Heating, ventilating & air conditioning

1C	Eugene J. Brandt & Co., Inc., New York, N. Y.	$993,368
2	R. T. Frye, Inc. & J. W. Hubert Corp	999,130
8	Riggs-Distler & Co., Inc	1,052,000

Alternate 1—substitute fan coil type room air conditioning units in lieu of induction coil type specified in base bid.
Alternate 2—water treatment equipment & service for one year from date of acceptance of the building.
Alternate 3—substitute foamglass pipe covering in place of cork covering.
Alternate 4—duct work for air conditioning the bank space.
Alternate 5—air conditioning system for unfinished portion of the first floor.
Alternate 6—unit price per lb for sheet metal.
Alternate 7—room thermostats mounted on face of columns instead of air thermostats as specified in base bid.
Alternate 8—unit price for thermostats on locations where necessary.

	1 C	2
Alternate 1	+$29,000	+$15,500
Alternate 2	+ 1,850	+ 2,650
Alternate 3	+18,000	+20,000
Alternate 4	+ 9,500	+ 8,800
Alternate 5	+15,000	+15,400
Alternate 6	+ 0.75	+ 0.85
Alternate 7	+ 4,180	+ 3,700
Alternate 8	+ 63.00	+ 80.00

Electrical construction

1C	Eastern State Electric Contractors, Inc., New York, N. Y.	$524,970
2	Arc Electric Construction Co	604,180
13	John G. Hellman Co., Inc	749,756

Alternate 1—elaborate underfloor duct system for more flexible use and less expense in power & telephone outlets as furniture layouts change over the years.
Alternate 2—substitute a three tube surface mounted lighting fixture in place of four tube lighting fixture specified.
Alternate 3—change in the electrical system which would be required for fan coil type installation.
Alternate 4—electrical work in the bank area.
Alternate 5—omission of electrical work in unfinished area on south side of first floor.
Alternate 6—installation of fan coil type units.

	1 C	2
Alternate 1	+$29,000	+$26,800
Alternate 2	−10,000	− 7,400
Alternate 3	+10,800	+13,200
Alternate 4	−15,400	−14,600
Alternate 5	− 6,100	− 6,200
Alternate 6	+10,960	+ 9,900

Plumbing construction

1C	Fein-Schlosberg, Inc., New York, N. Y	$186,713
2	Jarcho Bros., Inc	192,000
10	Meredith, Healey, Halloran Corp	249,600

Elevator construction

1	Westinghouse Electric Corp	$567,070
2C	Otis Elevator Co., New Yrok, N. Y	575,777

Alternate 1—substitute baked enamel steel in lieu of formica faced wood panels in the elevator cabs.
Alternate 2—electronic checks on elevator car doors.

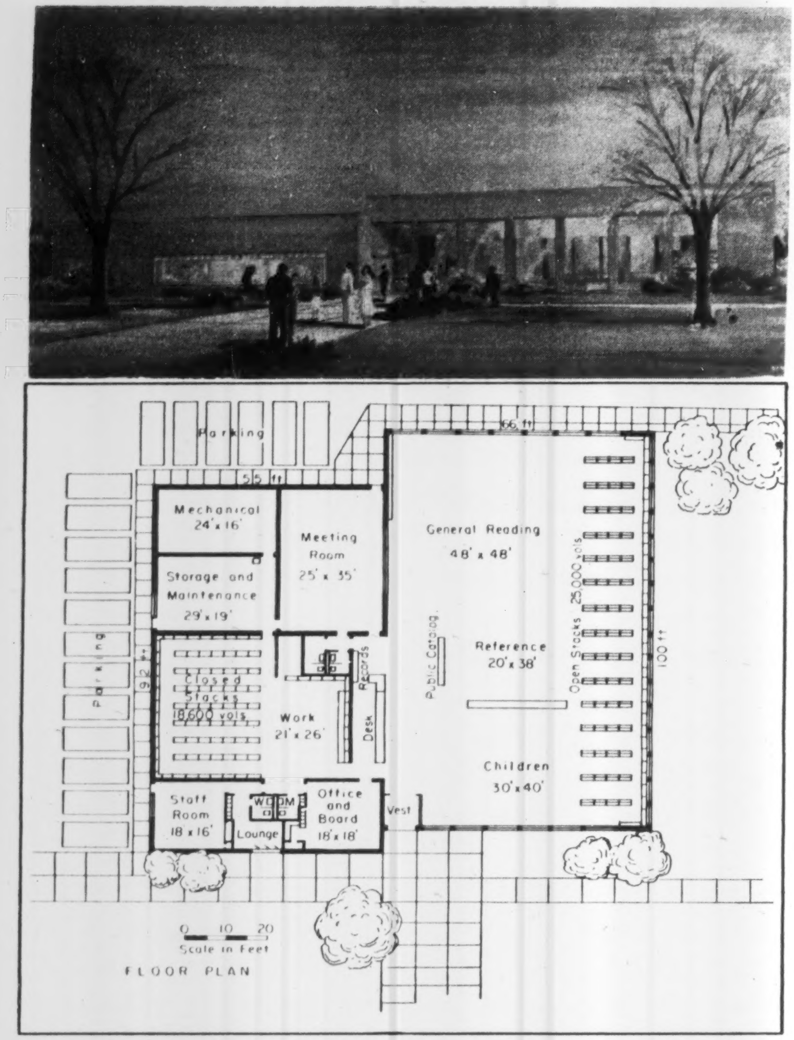
	1	2 C
Alternate 1	−$4,930	−$6,336
Alternate 2	......	+22,820

Moving stairs construction

1C	Otis Elevator Co., New York, N. Y	$98,722
2	Westinghouse Electric Corp	99,333
3	The Peele Co	120,850

Alternate 1—substitute stainless steel skirt panels for baked enamel steel specified in base bid.

	1 C	2
Alternate 1	+$2,137	....



50,000 VOLUME LIBRARY—exterior view and floor plan of public library, Ferndale, Michigan, Bery & Knapp, architects.

Public library, Michigan

A new 50,000 volume library being built by the town of Ferndale, Michigan, will cost $15.30 per sq ft and $0.83 per cu ft. These costs are based on the $178,619, low, contract-award bid by Freeman-Darling Co., Detroit, Michigan, which does not include architect's fee, engineer's fee and library furnishings. Bery & Knapp, Oak Park, Michigan, are the architects.

The building will be 121-ft wide; 106-ft deep; and 20-ft, 8-in. high, with a gross area of 11,660 sq ft and a 212,960 cu ft volume. Mechanical refrigeration rated at 60 tons is to provide summer cooling and a split, warm air-hot water system will heat the building during the winter. Illumination will be supplied by flush type, incandescent fixtures. This electrical and mechanical work is included in the general contract.

The exterior finish of the building will be face brick with limestone trim and the interior finish consists of plaster walls, asphalt tile floors, and acoustical tile ceilings. Heat absorbing glass is to be used in the south elevation. Also included in the general contract are finish grading, lawn seeding and walks.

Wage rates in this area include: plasterers, $3.32 per hr; bricklayers, $3.30 per hr; structural iron workers, $3.23 per hr; electrical workers, $3.22 per hr; carpenters, $3.08 per hr; and common laborers, $2.28 per hr. The project began August 3 and will be completed in 210 calendar days.

Bidders include:

1C	Freeman-Darling Co., Detroit, Michigan	$178,068*
2	Bidder #2	178,700
12	Bidder #12	196,253

Bids. 6-29-53

Item	1C—Costs
Excavating	3,500
Concrete	10,000
Masonry	24,000
Stone	6,200
Caulking & weatherstripping	100 00
Waterproofing	800 00
Structural steel	13,500
Steel roof deck	4,000
Lockers	150 00
Display case	150 00
Metal doors	200 00
Aluminum entrance	2,500
Aluminum windows	4,450
Roofing-sheet metal	4,500
Carpentry	3,000
Millwork	2,500
Lath & plaster	6,500
Marble & tile	1,000
Resilient flooring	2,500
Glazing	2,000
Accoustical work	5,000
Finish hardware	800 00
Painting	1,500
Partitions	1,000
Rubber mats	85 00
Kitchen unit	600 00
Landscaping	3,000
Plumbing, heating, air conditioning, ventilating	47,000
Electrical	9,500
Construction bond	1,800
Contr supervision, insur, misc, overhead & profit	16,784

* Base proposal-additions to work bring contract amount to $178,619.

Sewers

Water & sewage system, Kentucky

Despite the fact that it was not low bidder on every part of a water and sewage system job, Bush Building Co., Nashville, Tenn., walked off with all five contracts, totaling $694,415, awarded by the town of Barbourville, Ky. Bush had stated with its proposal that it "reserved the right not to accept award of any single contract unless awarded all others." The total bid was 5% below the engineers' estimate by Alfred LeFeber & Associates, Cincinnati, Ohio.

On the water treatment plant contract, Bush, second low bidder, was underbid 5% by Fred E. Hicks, Nashville, Tenn. First bids entered on the storage reservoir found Bush in the position of high bidder, but subsequent bargaining reduced its bid on two items, putting it in the low bidder spot. Bush was low bidder on the other three contracts for the water mains, sewer and pump stations, and sewage treatment plant.

The water treatment plant will have a 0.72 mgd normal capacity; 1.08 mgd maximum capacity; and 1.41 mgd future capacity. Mixing coagulation, settling filtration and chlorination are the types of treatment that will be employed. The plant will utilize raw water pumps and high service pumps.

Treatment in the sewage treatment plant will consist of screening, primary settling, separate sludge digestion, and sludge drying beds. The average capacity will be 0.3 mgd. and the maximum capacity, $.375 mgd.

Barbourville, Ky., site of the plant, is a typical small community in southeastern Kentucky. The population is

Continued on following page

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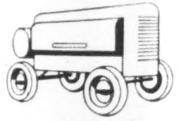
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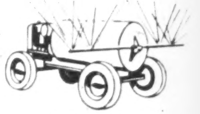
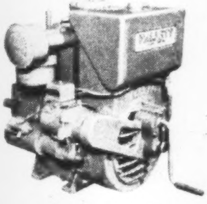

SPRAYERS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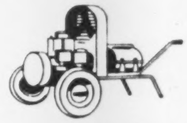
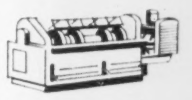

HEATERS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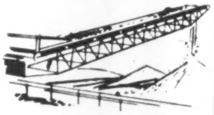
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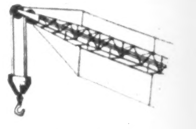
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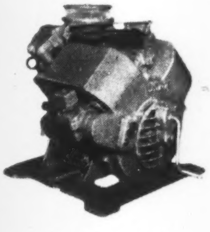
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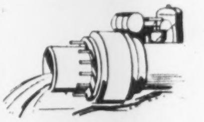
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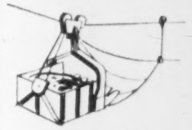
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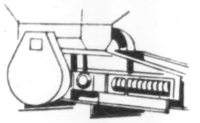
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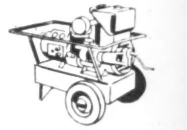
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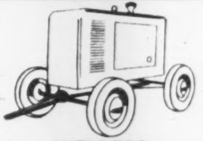
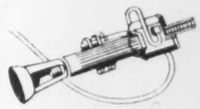
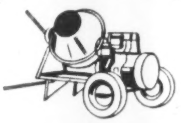
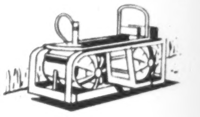
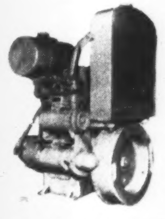
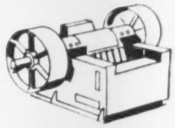

WELDERS

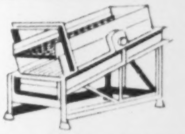

TAMPERS


CONCRETE MIXERS


CONCRETE CUTTERS


Model D1-A RSC 8 hp.


JAW CRUSHERS


VIBRATING SCREENS

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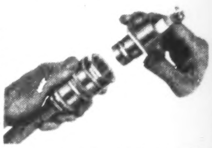

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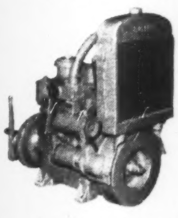
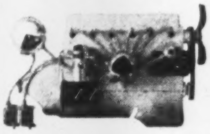

Model D2-RSC 18 hp.

HALLETT Radio Interference Reduction and Control Equipment.



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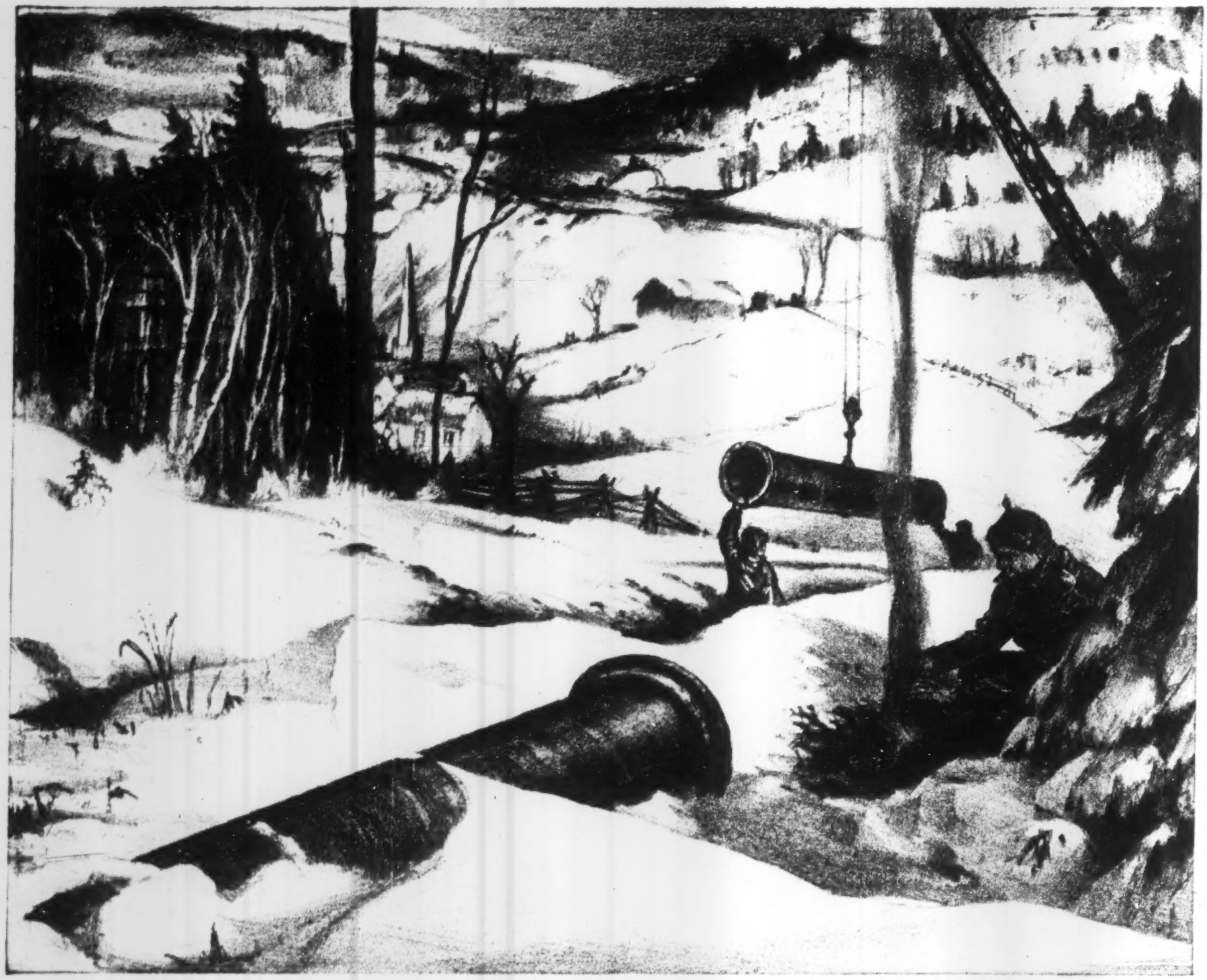

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AND INDUSTRIAL SERVICE

Water & sewage, Ky.

Continued from preceding page

about 3,100 making it representative of that large group of villages and cities who are finding it extremely difficult to finance municipal projects, particularly sewage plants.

Bidders include:

Water mains

1C	Bush Building Co., Nashville, Tenn	$97,940
2	H. M. Dunn, Corbin, Kentucky	127,078
4	C. V. Caudill, Bowling Green, Kentucky	135,725

Bids: 7-16-52 Item	Unit	Quantity	Unit Prices 1 C	 2
F&L 4" cl 150 CI pipe	lf	125	$2.50	$3.25
6"	lf	6,450	3.20	3.75
8"	lf	5,400	4.00	4.40
F&L CI fittings	t	10	450.00	470.00
F&L 2" galv steel pipe	lf	6,500	1.30	1.90
F&L additional cl 150, 6" cast iron pipe	lf	7,500	3.10	3.75
F&L misc galv malleable iron fittings	lb	500	0.50	0.80
Furn & set 2" gate valves	ea	10	25.00	20.65
4"	ea	16	40.00	50.48
6"	ea	13	65.00	76.95
8"	ea	9	95.00	120.25
F&S valve boxes	ea	48	8.50	22.69
F&S valve box extensions	ea	5	5.00	11.06
F&S fire hydrants	ea	3	15.00	182.65
Work on existing mains	ls	1	2,500	4,600
Repaving—concrete	sy	45	18.00	8.00
Repaving—asph or other pavement on conc base	sy	100	10.00	10.00
Repaving—black top on stone base	sy	2,550	3.00	8.00
Repaving—crushed stone or gravel	sy	160	1.50	5.00
Sidewalk	sf	200	0.75	0.60
Cl 1 concrete	cy	10	70.00	60.00
cl 2	cy	5	60.00	59.00
cl 3	cy	30	40.00	58.00
Reinforcing steel	lb	100	0.15	0.35
Extra excavation	cy	100	3.00	6.00
Sheeting left in place	mbm	10	100.00	100.00
Slag or stone refill	cy	10	5.00	6.00

Storage reservoir

1C	Bush Building Co., Nashville, Tenn	$32,305
2	Dawson-Evans Const. Co., Cincinnati, Ohio	33,675
5	Goodwin Construction Co., Lexington, Ky.	41,767

Bids: 7-16-52 Item	Unit	Quantity	Unit Prices 1 C	 2
Conc storage reservoir	ls	1	$43,879*	$23,576
Valve vaults (2)	ls	1	2,500	3,866
Piping & valves	ls	1	1,887*	5,764
Extra excavation	cy	5	3.00	6.00
Extra cl 1 concrete	cy	2	75.00	57.00
Extra cl 3 concrete	cy	5	60.00	54.00
Extra reinforcing steel	lb	100	0.15	0.15
Slag or stone refill	cy	5	5.00	8.00

* These items negotiated down to a $29,300 total

Water treatment plant

1	Fred E. Hicks Knoxville, Tenn	$152,249
2C	Bush Building Co., Nashville, Tenn	159,582
5	C&C Construction, Ft. Wayne, Indiana	189,505

Bids: 8-16-52 Item	Unit	Quantity	Unit Prices 1	 2 C
Outside sewers & drains	ls	1	$1,462	$2,800
Outside piping & valves	ls	1	5,337	1,350
Treatment plant building	ls	1	48,209	75,762
Inside piping & valves	ls	1	14,530	10,350
High service pumps (2)	ls	1	4,222	4,025
Wash water pump	ls	1	1,835	1,750
Duplex sump pump	ls	1	1,301	1,000
Filter underdrains (3)	ls	1	3,213	3,750
Wash water troughs (6)	ls	1	1,085	1,500
Filter media (2)	ls	1	1,044	1,000
Filter rate controllers (2)	ls	1	3,600	3,750
Filter-Loss-of-head & rate-of-flow gauges (2)	ls	1	1,918	2,300
Chemical feeders (3)	ls	1	5,512	4,025
Chlorination equipment	ls	1	2,866	2,500
Clearwell level gauge	ls	1	477	700.00
Raw & finished water flow meters (2)	ls	1	2,262	3,000
Electric hoist	ls	1	335.00	600.00
Water treating tank & equipment	ls	1	24,173	10,300
Plumbing	ls	1	2,903	3,500
Heating	ls	1	2,705	3,500
Electrical work	ls	1	13,173	13,800
Painting	ls	1	2,000	3,000
Grading, driveways & walks	ls	1	1,407	950.00
Lab & office equipment	ls	1	2,200	2,200
Extra excavation	cy	10	4.00	5.00
Extra cl 1 concrete	cy	5	85.00	85.00
Extra cl 2 concrete	cy	5	60.00	80.00
Extra cl 3 concrete	cy	5	45.00	75.00
Extra reinf steel	lb	1,000	0.14	0.12
Sheeting left in place	mbm	5	50.00	150.00
Slag or stone refill	cy	10	10.00	5.00

Sewer and pump stations

1C	Bush Building Co., Nashville, Tenn	$309,932
2	C. W. Davis & Son, Huntington, West Virginia	476,006

Bids: 7-16-52 Item	Unit	Quantity	Unit Prices 1 C	 2
Vit pipe sewer std str, 8"	lf	30,200	$3.30	$4.37
10"	lf	4,200	3.80	5.23
12"	lf	1,100	4.30	11.04
Vit pipe sewer ext str, 8"	lf	1,600	5.00	4.90
10"	lf	2,600	5.50	5.89
12"	lf	700	6.50	12.11
Conc pipe sewer, reinf, 8"	lf	100	8.00	5.28
std plain, 8"	lf	31,200	3.25	4.44
std plain, 10"	lf	6,500	3.70	5.24
std plain, 12"	lf	1,350	4.20	11.19
reinforced, 8"	lf	700	7.50	5.28
reinforced, 10"	lf	300	5.50	5.89
reinforced, 12"	lf	450	8.00	11.79
Standard manholes	ea	152	25.00	448.00
Drop manholes	ea	7	300.00	492.75
House taps	ea	600	4.00	2.64
Vit sewer pipe, 6"	lf	11,150	3.00	3.77
Vit 45° bends, 6"	ea	550	3.00	2.20
Vit 90° bends, 6"	ea	550	3.00	2.20
6" stopper	ea	550	0.20	0.68
Sewer pipe stopper, 8"	ea	100	0.25	0.99
10"	ea	10	0.35	1.18
CI pipe, B&S, cl 150, 6"	lf	1,150	3.25	4.42
CI pipe, mech joint, cl 150 4"	lf	660	2.60	4.07
Special fittings, B&S cl D 6" CI	t	0.60	500.00	467.00
Special fittings, mech joint 4" CI	t	0.50	600.00	528.00
Conc street restoration	sy	1,600	6.00	10.61
Asph street restoration	sy	800	7.00	12.14
Black top street restoration	sy	11,500	1.50	5.86
Stone or grav restoration	sy	800	1.25	3.00
Conc sidewalk restoration	sf	2,700	0.60	0.66
Conc curb &gutter restoration	lf	100	5.00	3.00
Relaying storm sewers, 12"	lf	100	3.00	10.00
15"	lf	100	4.00	12.00
18"	lf	100	5.00	14.00
24"	lf	200	6.00	16.00
Bridge hangers	ls	1	1,500	300.00
Concrete, class 2	cy	5	0.70	35.00
Concrete, class 3	cy	40	0.50	230.00
Extra excavation	cy	10	5.00	3.30
Sheeting left in place	mbm	10	100.00	220.00
3 pumping stations	ls	1	40,000	38,772

Sewage Treatment plant

1	Fred E. Hicks, Knoxville, Tenn	$87,583
2C	Bush Building Co., Nashville, Tenn	96,165
6	C. W. Davis, Huntington, W. Va	140,753

Bids. 8-16-52 Item	Unit	Quantity	Unit Prices 1 C	 2
Inside & outside pipe, sew, drn, valve, hydrant & outlet structure	ls	1	$20,115	$17,500
Overflow chamber	ls	1	770.00	1,025
Manholes	ls	1	1,555	2,060
Screen chamber	ls	1	691.00	975.00
Clarifier tank & equip	ls	1	13,725	20,950
Sludge digestion tank & control house	ls	1	27,380	32,500
Sludge beds	ls	1	10,963	7,250
Sludge Pump	ls	1	1,531	1,700
Plumbing	ls	1	813.00	1,200
Electrical work	ls	1	2,816	4,000
Grading	ls	1	1,000	1,650
Roadways	sy	1,875	1.15	1.70
Walks	sf	50	5.00	0.75
Painting	ls	1	2,000	600.00
Extra excavation	cy	10	5.00	3.00
Extra class 1 concrete	cy	5	50.00	70.00
Extra class 2 concrete	cy	5	47.50	65.00
Extra class 3 concrete	cy	10	45.00	50.00
Extra reinforcing steel	lb	1,000	0.15	0.15
Slag or stone refill	cy	10	10.00	5.00
Sheeting left in place	mbm	5	50.00	100.00

Sewage treatment, plant, Arkansas

Because of its river bank location, a primary sewage treatment plant in Arkadelphia, Arkansas, requires deep excavation in its pump station. The excavation is necessary to resist the uplift of 6-ft flooding above the site. When completed, the plant will have a capacity of 0.9 mgd. Max A. Mehlburger, Little Rock, is the engineer.

Ernest J. Ward, Benton, Arkansas, entered the lowest of five bids to the city of Arkadelphia. His bid was under that of the second low bidder by 6% and the high bidder by 53%. It was the only bid below the 5% higher engineer's estimate.

The project began August 10 and will take 150 days.

Bidders include:

1C	Ernest J. Ward, Benton, Arkansas	$132,231
2	Enix Const. Co., Amarillo, Texas	140,594
5	Midwestern Const., Inc., Tulsa, Oklahoma	279,143
EE	Max A. Mehlburger, Little Rock, Arkansas	139,028

Bids. 7-24-53 Item	Unit	Quantity	Unit Prices 1 C	 2
Excavation & embankment	cy	2,850	$2.25	$2.00
Concrete	cy	780	60.00	49.00
Reinforcing steel	lb	79,000	0.11	0.12
Bar screen & grit chamber	ls	1	11,037	12,289
Primary clarifier	ls	1	6,697	8,600
Floating cover	ls	1	14,620	16,490
Chlorinator	ls	1	4,085	4,590
625 GPM duplex pumps	ls	1	4,810	6,600
Sludge pump	ea	1	1,025	1,473
Supernatant selector	ls	1	996.00	1,474
Waste gas burner	ls	1	582.00	990.00
Sludge bed walls	ls	1	1,640	3,240
Sand for sludge beds	cy	400	3.60	5.00
Gravel for sludge beds	cy	500	4.25	5.00
Pump house building	ls	1	5,315	9,744
3" galv water line	lf	3,000	1.25	1.80
2" fire hydrants	ea	3	80.00	97.00
Cyclone fence	lf	1,200	2.50	2.90
Manholes	ea	3	95.00	250.00
6" CI pipe (class 100)	lf	620	2.36	3.00
8" CI pipe (class 100)	lf	17	3.30	3.60
18" CI pipe (class 100)	lf	200	9.34	9.00
20" CI pipe (class 100)	lf	110	15.11	10.00
Concrete pipe, 6"	lf	540	1.20	1.00
8"	lf	280	1.35	1.25
Gate valve & box, 3"	ea	4	47.00	45.00
6"	ea	5	75.50	75.00
8"	ea	6	102.65	105.00
Cast iron fittings	lb	5,500	0.46	0.25

Sewer, Connecticut

Five bidders competed for a $49,936 sewer contract awarded by the city of Winsted, Connecticut, to DiMascio Bros. & Co., Dorchester, Mass., lowest of five bidders. The bidding was widely spread with an average of 11% separating each of the bids. The low bid was 8% below the second low and 37% below the high.

Work consists of installing a sewer and appurtenances between two manholes on Wetmore Avenue and short sections of connecting sewer to be used for future connections.

Each bidder also submitted a price for furnishing and installing 6-in. tile house connection. This will be charged each adjoining property owner who wants such a connection to come to within 5 ft of the house.

Bidders include:

1C	DiMascio Bros. & Co., Dorchester, Mass	$49,936
2	A. Salvatore & Sons Const. Co.	54,497
5	S.D. & W. Construction Co	79,435

Bids. 7-29-53 Item	Unit	Quantity	Unit Prices 1C	 2
Exc & backfill, not over 10' deep	lf	1,560	$1.00	$1.00
10'-15'	lf	1,460	5.00	2.00
F&I tile sewer pipe, 6"	lf	640	5.00	5.00
8"	lf	2,380	6.00	11.10
Rock excavation	cy	540	15.00	12.00
Test pit excavation	cy	10	2.00	10.00
Standard manholes	ea	5	225.00	220.00
Standard deep manholes	ea	4	350.00	300.00
Drop on manholes	vf	15	15.00	20.00
House connec chimneys	vf	115	8.00	10.00
Y or T branch in 8" sewer	ea	39	3.00	3.50
Crush stone or grav fndn	cy	20	5.00	6.00
Sand backfill	cy	1,580	3.00	1.80
Concrete cradle	cy	80	25.00	20.00
Replace surface city pvmnt	lf	3,020	1.50	1.50
Connect to exist drains	ea	20	10.00	30.00
Hydrostatic test	lf	2,380	0.05	0.10
House connec for property owners	lf	......	8.00	5.00

Continued on following page

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Remove and Replace Axle Differential Carrier	**8-10 hrs. (2 Men)**
Adjust P.C.U. Brake and Clutch	**10-15 Min. (1 Man)**
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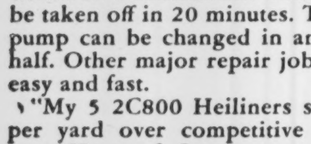
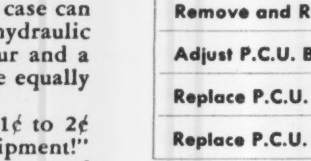


13 and 18-yd. Heiliner Scrapers



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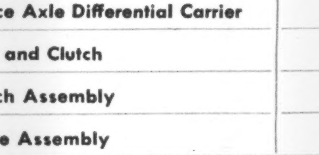

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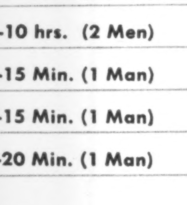

Cable Power Control Units

Waterworks

Water system, Texas

A $275,031 water system project in Anahuac, Texas, drew fifteen bidders for its three contracts. Only 1% separated the low bidder from the second low on the water line and pump station section. This section drew the largest number of bidders with fifteen contractors competing for the award. Only two bids were entered on each of the two remaining parts for water storage tanks and water wells. These were separated by 5% and 7% respectively. Freese, Nichols and Turner, Houston, are the engineers.

Work consists of installing a water pump station; two water storage tanks (a 75,000 gal steel elevated tank and a 150,000 gal steel ground storage tank); and two 250 gpm water wells. Two more contracts for a sewer collection system and disposal plant have not yet been awarded.

The pump station will take 90 days; the tanks, 330 days; and the wells, 90 days. Bidders include:

Water line & pump station

1C	V. Clouse, Abilene, Texas	$204,721
2	Gerald Mora, Houston, Texas	207,123
11	Glaze & Vest, El Campo, Texas	287,856

Bids. 7-30-53		Quan-	Unit Prices	
Item	Unit	tity	1 C	2
Water pump station	ls	1	$18,124	$25,000
AC pipe, 8"	lf	15,380	2.69	2.50
6"	lf	23,400	1.98	1.85
4"	lf	14,400	1.32	1.40
3"	lf	34,900	0.93	1.05
Cast iron fittings	t	13.89	340.00	400.00
HE gate valves, 8"	ea	14	86.10	90.00
6"	ea	28	61.35	80.00
4"	ea	19	47.15	50.00
2"	ea	47	40.00	30.00
AC pipe in bored tunnel under rail road, 8"	lf	54	15.00	15.00
6"	lf	18	15.00	12.00
3"	lf	18	12.00	10.00
AC pipe in bored tunnel under highway, 8"	lf	50	15.00	15.00
6"	lf	90	15.00	12.00
4"	lf	30	12.00	10.00
3"	lf	90	12.00	10.00
Class "D" concrete	cy	20	30.00	20.00
¾" copper tubing serv conn with meter & box	ea	413	48.33	40.00
¾" copper tubing	lf	12,380	0.69	0.70
1" copper tubing serv conn with meter & box	ea	15	56.18	80.00
1" copper tubing	lf	450	0.90	0.90
Extra excavation	cy	10	5.00	2.00
Extra class "A" concrete	cy	10	40.00	20.00
Extra reinf steel	lb	100	0.20	0.15
Timber ordered left in trench	mfbm	10	100.00	50.00
Service clamp for conn ¾" service to 3" AC	ea	125	3.60	....

Water storage tanks

1C	Chicago Bridge & Iron Co., Houston, Texas	$44,335
2	Pittsburgh-Des Moines Steel Co., Dallas, Texas	46,692

Bids. 7-30-53		Quan-	Unit Prices	
Item	Unit	tity	1 C	2
75,000 gal stl elev tank	ls	1	$31,750	$33,470
150,000 gal stl gnd storage tank	ls	1	11,775	12,500
Extra conc	cy	10	75.00	62.00
Extra excavation	cy	15	3.00	6.00
Extra reinforced steel	lb	100	0.15	0.12

Water wells

1C	Layne-Texas Co., Ltd., Houston, Texas	$25,975
2	Texas Water Wells, Inc., Houston, Texas	28,049

Bids. 7-30-53		Quan-	Unit Prices	
Item	Unit	tity	1 C	2
Two 250 GPM water wells	ls	1	$25,975	$28,049

Water filtration plant, Louisiana

A $1,020,030 water filtration plant and river intake will be constructed in Chalmette, Louisiana, by the Rust Engineering Co., Birmingham, Alabama, lowest of eight bidders. The plant will have a 5 mgd capacity with 3 mgd in ground storage facilities and two 75-ft dia clariflocculators. Contract conditions call for construction of the complete plant with intake crib and fender in the Mississippi River; raw water pumping station; and administration buildings.

Twenty-one percent separated the high and low bids with an average spread of 3.4% between each of the bids.

In this area electrical workers are receiving $2.95 per hr; steam fitters, $2.75 per hr; plasterers, $2.65 per hr; carpenters, $2.42 per hr; and common laborers, $2.375 per hr. The project began October 1 and will take approximately one year. Bidders include:

1C	Rust Engineering Co., Birmingham, Ala	$1,020,030
2	Pittman Const. Co., New Orleans, La	1,064,059
8	Farnsworth & Chambers, Houston, Texas	1,298,968

Bids: 8-18-53		Quan-	Unit Prices	
Item	Unit	tity	1 C	2
30" CI molox pipe on pile bents	lf	1,000	$107.00	$119.84
30" CI MJ pipe	lf	10	31.00	145.00
24"	lf	1,510	21.50	18.58
20"	lf	10	20.50	19.05
18"	lf	430	16.00	11.75
16"	lf	100	13.50	10.50
14"	lf	210	11.50	9.70
12"	lf	250	9.50	7.95
10"	lf	80	9.00	6.95
8"	lf	50	8.00	6.60
6"	lf	1,930	4.50	6.05
4"	lf	90	3.50	3.30
2"	lf	1,300	2.50	1.10
12" conc storm drain	lf	200	3.50	2.10
Storm water inlets	ea	3	140.00	75.00
10" gate valve & box	ea	1	250.00	256.80
6" gate valve & box	ea	2	180.00	250.00
2" gate valve & box	ea	1	50.00	55.00
Intake crib & fender	ls	1	38,500	29,425
Raw water pump sta	ls	1	48,600	58,784
Water treatment plant	ls	1	748,900	786,254
Cast iron fittings	t	5	700.00	834.60
Yard grading	ls	1	5,000	2,500
Walks and drives	ls	1	4,700	3,905
Ditch excavation	cy	1,600	0.85	0.80
18" gate valves	ea	2	660.00	1,164

Airports

Airfield additions, Idaho

A combination of Morrison-Knudsen Co., Inc. and J. A. Terteling & Sons, Inc., have contracted with the U. S. Army Corps of Engineers for extension of facilities at the Mountain Home Air Force Base, Elmore County, Idaho. The $6,112,013 Morrison-Knudsen-Terteling low bid was 13% below the second low bid and 26% below the high. An average of 7.3% separated each of the bids. The contract-award bid was also 10% below an estimate prepared by the district engineer at Walla Walla, Wash.

Work consists of extending aprons, runways, and taxiways; strengthening existing aprons, runways, and taxiways; constructing an airfield lighting utilities system; and installing an electrical-distribution system.

Wage rates in the area include: bricklayers, $3.10 per hr; cement finishers, $2.59 per hr; carpenter, $2.45 per hr; and common laborers, $1.90 per hr. The job will take 230 days.

Bidders include:

1C	Morrison-Knudsen Co., Inc. & J. A. Terteling & Sons, Inc., Boise, Idaho	$6,112,013
2	McLaughlin-Lytle-Birch, GreatFalls, Mont.	6,999,239
5	Conley & Yett, Portland, Oregon	8,271,730
EE	U. S. Army Corps of Engineers, Walla Walla, Washington	6,775,040

Bids: 9-1-53		Quan-	Unit Prices	
Item	Unit	tity	1 C	2
Clearing & grubbing	ac	180	$69.00	$70.00
Rem existing conc for utility systems 5	sy	4,720	2.10	1.85
Rem existing asph for utility systems	sy	1,120	1.20	0.90
Rem existing storm sewer	lf	13,270	2.30	2.55
Rem existing 4" water line	lf	1,180	0.60	1.75
Trench, 4" & larger water pipe normal backfill	lf	15,330	1.40	0.65
fully compacted backfill	lf	1,780	2.00	1.90
Rock exc trenches for pipe less than 24" dia	cy	1,840	10.00	13.75
24" and larger dia	cy	7,920	9.50	13.50
Riprap	cy	140	13.00	44.00
Rock exc for ditches	cy	36,200	4.30	10.25
Excavation for ditches	cy	91,500	0.21	0.65
4" water pipe	lf	580	1.80	1.75
8"	lf	12,850	3.30	3.00
10"	lf	3,310	4.50	4.65
CI water pipe fittings	lb	5,010	0.50	0.35
Fire hydrant	ea	33	375.00	580.00
Gate valve, 4"	ea	2	60.00	66.00
6"	ea	5	80.00	95.00
8"	ea	15	120.00	125.00
10"	ea	4	170.00	190.00
4" shackle, valve	ea	1	22.00	25.00
4" shackle, plug	ea	1	13.00	11.00
6" shackle, valve	ea	5	23.00	25.00
6" shackle, plug	ea	10	13.00	11.00
8" shackle, valve	ea	4	25.00	25.00
8" shackle, plug	ea	6	16.00	11.00
10" shackle, valve	ea	1	42.00	40.00
10" shackle, plug	ea	2	25.00	25.00
Trench for 8"-12" storm drn 0 to 6'-8', normal backfill	lf	10	1.60	1.00
8"-12" strmdrn, 0 to 8'-10', normal backfill	lf	75	2.00	1.40
8"-15" stm drn, 0 to 8'-10' fully compacted bkfill	lf	225	3.20	2.50
18"-21" stm drn, 0 to 8"-10' normal backfill	lf	1,575	2.60	1.50
18"-21" stm drn, 0 to 8'-10' fully compacted bkfill	lf	1,460	4.00	2.90
24"-30" stm drn, 0 to 6', normal backfill	lf	200	2.00	1.20
24"-30" stm drn, 0 to 6'-8' normal backfill	lf	800	2.80	1.50
24"-30" stm drn, 0 to 6'-8' fully compacted bkfill	lf	100	4.30	3.00
36" stm drn, 0 to 6'-8' normal backfill	lf	1,820	3.20	1.60
36" stm drn, 0 to 8'-10' normal backfill	lf	180	4.20	1.75
42"-54" stm drn, 0 to 6'-8' normal backfill	lf	700	4.20	2.20
42"-54" stm drn, 0 to 8'-10' normal backfill	lf	6,160	5.25	2.35
42"-54" stm drn, 0 to 8'-10' fully compacted bkfill	lf	1,360	7.90	4.50
42"-54" stm drn, 0 to 10'-12' normal backfill	lf	650	6.40	2.85
42"-54" stm drn, 0 to 10'-12' fully compacted bkfill	lf	220	9.50	5.65
42"-54" stm drn, 0 to 12'-14' normal backfill	lf	1,520	7.40	3.50
42"-54" stm drn, 0 to 12'-14' fully compacted bkfill	lf	340	11.00	6.85
Trench for elec ducts up to 6' deep—1.5' & 2' wide, fully compacted bkfill	lf	5,575	1.20	1.40
2.5' & 3' wide, norm bkfill	lf	2,815	1.00	1.07
2.5'-3' wide, fully compacted backfill	lf	8,575	1.60	1.58
3.5'-4' wide, fully compacted backfill	lf	2,016	1.75	1.70
Select mat for refill of unstable trench bottom	cy	100	5.50	3.70
Replace pavement at trench crossings of existing streets	sy	16	12.50	8.25
Storm drain, 8"	lf	532	1.00	2.80
12"	lf	6	2.00	3.85
15"	lf	264	2.75	5.30
18"	lf	942	3.50	6.25
Reinf conc pipe drain, 18"	lf	500	3.75	6.75
Storm drain, 21"	lf	1,072	4.25	7.20
Reinf conc pipe drain, 21"	lf	500	4.60	7.40
24"	lf	500	5.90	9.00
30"	lf	600	9.00	12.00
36"	lf	2,000	11.15	14.60
42"	lf	2,982	14.50	16.20

Continued on following page

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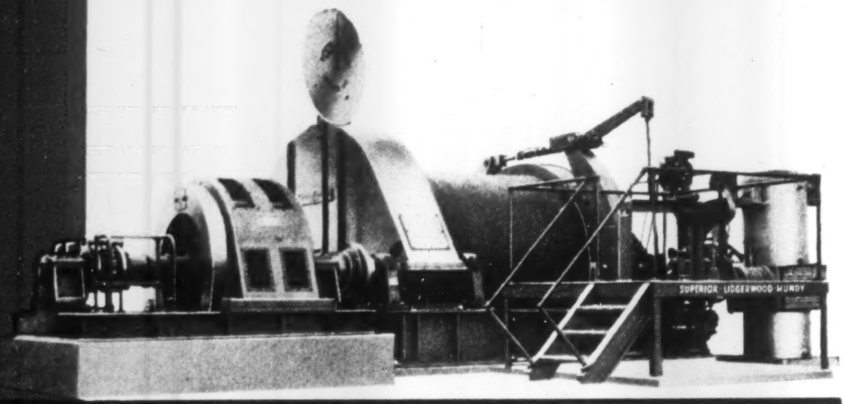

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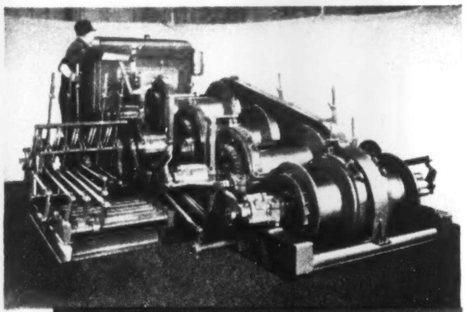

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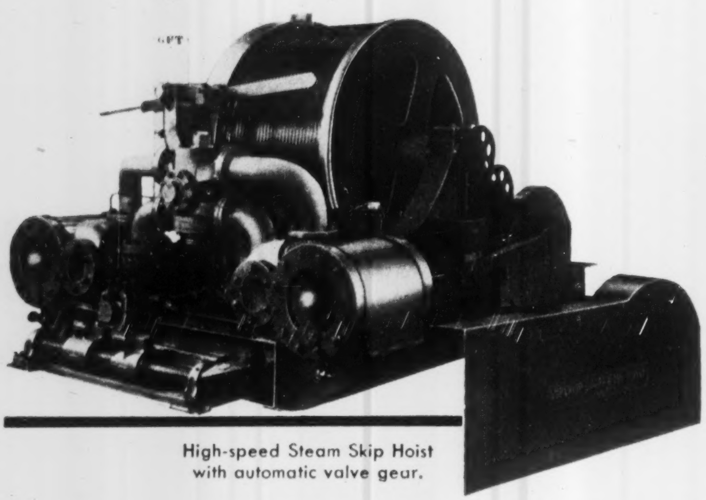

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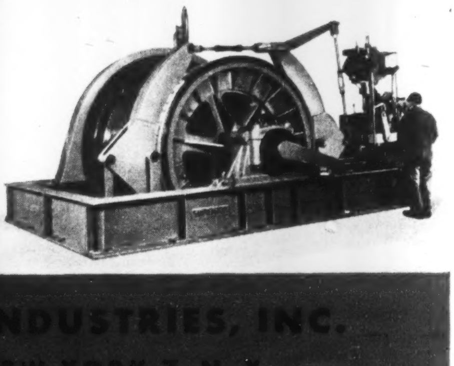

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Airfield, Idaho

Continued from preceding page

Bids: 9-1-53 Item	Unit	Quan- tity	Unit Prices 1 C	 2
48″ rein conc pipe dr	lf	2,505	17.00	20.30
54″	lf	5,426	23.50	27.75
Conc culv pipe, 54″	lf	1,500	23.50	27.75
Drain MH, type C, 0-6′ deep	ea	7	480.00	290.00
type C, 6′-8′ deep	ea	12	575.00	485.00
type A, 8′-10′ deep	ea	4	780.00	645.00
type B, 8′-10′ deep	ea	5	780.00	645.00
type C, 8′-10′ deep	ea	1	775.00	670.00
type A, 10′-12′ deep	ea	2	1,060	1,120
type b, 10′-12′ deep	ea	3	1,100	1,120
type A, 12′-14′ deep	ea	1	1,260	1,325
type B, 12′-14′ deep	ea	2	1,160	1,325
Storm drain inlet, 1.5′x1′	ea	4	100.00	115.00
1.5′x2′	ea	11	137.00	125.00
1.5′x3′	ea	2	190.00	130.00
1.5′x4′	ea	3	227.00	150.00
1.5′x5′	ea	1	267.00	165.00
1.5′x6′	ea	2	310.00	180.00
1.5′x7′	ea	1	363.00	200.00
Concrete pipe plug, 8″	ea	11	3.00	1.10
12″	ea	2	3.00	1.65
18″	ea	1	4.00	2.75
21″	ea	5	6.00	3.85
Wye branch for storm drain				
12″x12″x8″	ea	2	11.00	6.60
18″x18″x8″	ea	2	18.00	13.20
21″x21″x8″	ea	4	21.00	14.30
Connection to existing MH	ea	1	110.00	525.00
Sleeving existing water line				
4″	lf	220	4.40	7.70
8″	lf	1,550	4.50	7.00
10″	lf	485	6.00	8.35
Cross under ditch with existing water line	ls	1	900.00	605.00
Reinf conc encased duct				
single	lf	2,448	2.50	2.45
two-way bank	lf	2,400	5.00	4.80
three-way bank	lf	2,312	7.00	6.70
four-way bank	lf	4,980	8.60	8.27
eight-way bank	lf	445	15.00	14.20
nine-way bank	lf	1,600	16.50	15.90
twelve-way bank	lf	840	20.80	20.10
fifteen-way bank	lf	110	24.60	23.65
twenty-way bank	lf	1,642	30.00	28.60
Conc encased duct bank				
four-way	lf	1,550	7.10	7.08
eight-way	lf	479	13.00	12.65
twelve-way	lf	890	19.20	18.90
Electrical manhole, type A	ea	5	900.00	875.00
type B	ea	17	820.00	805.00
type C	ea	9	940.00	910.00
type D	ea	3	2,570	2,440
type E	ea	18	2,100	1,995
Electric handholes	ea	16	280.00	288.00
Copper conductor, 600 V, type				
RR, no. 8 Awg	mf	110	192.00	181.00
no. 1	mf	85	490.00	458.00
no. 1/0	mf	39	560.00	535.00
no. 2/0	mf	34	680.00	651.00
no. 3/0	mf	40	825.00	783.00
250 MCM	mf	39	1,080	1,112
Apron receptacle, new apron	ea	44	278.00	285.00
existing apron	ea	32	273.00	288.00
1½″ galvanized conduit	lf	7,000	0.95	0.90
No. 6-D copperweld gr cable	lf	7,530	0.10	0.14
Stl pipe encased in CMP				
sleeve, 16″ encased in 21″	lf	810	20.00	26.00
12″ encased in 15″	lf	2,400	13.60	21.00
10″ encased in 15″	lf	240	11.80	19.00
8″ encased in 12″	lf	120	8.70	15.00
6″ encased in 10″	lf	360	6.80	13.60
4″ encased in 8″	lf	3,200	5.10	12.00
10″ XS pipe for protective sleeves	lf	7,000	8.70	15.00
1½″ galv WI pipe	lf	7,000	1.20	1.20
Vent pits including vent piping				
for POL lines	ea	3	250.00	480.00
for POL sleeves	ea	52	39.00	93.00
for water pipe sleeves	ea	10	32.00	93.00
Rem existing conc pvmnt for airfield paving	sy	24,200	0.30	0.40
Rem existing asph pvmnt for airfield paving	sy	38,100	0.10	0.28
Excavation, unclassified	cy	152,000	0.86	0.60
Excavation, unclassified	cy	135,000	....	0.60
PCC-16″ thick	cy	174,000	6.60	8.50
14″ thick	cy	152,000	....	9.50
Portland cement	bbl	238,000	5.37	5.34
Portland cement	bbl	208,000		5.34
Tie down flexible	ea	3,449	10.00	11.00
with static ground	ea	349	11.00	15.00
Tie down rigid	ea	2,420	4.30	1.65
with static ground	ea	723	5.00	3.00
Select gravel subbase & base course	cy	94,000	1.87	1.50
Crushed quarried rock base course	cy	100,000	....	6.33
Crushed gravel base course	cy	6,000	2.75	5.00
Crushed gravel, feathering material	cy	60	4.20	11.25
Roll existing pavement	hr	220	22.00	20.00
Sterilize existing asphalt paving	sy	151,200	0.16	0.15
Prime coat (MC-O)	t	90	51.00	60.00
Tack coat (RC-2)	t	1,360	51.00	60.00
Asph binder course	t	93,700	5.80	7.65
Asph surface course	t	62,700	5.80	7.90
Asphaltic cement	t	9,380	51.00	40.00
Asphalt (MC-5)	t	16	51.00	67.60
Aggr for double bit surface treatment	t	220	5.80	7.00
Paint runway, taxiway, and jet blast paving	ls	1	11,500	6,800
Prepare seed bed for dryland grass	ac	124	35.00	34.00
Straw mulch for dry-land grass	ac	124	109.00	102.00
Seed dry-land grass	ac	124	100.00	102.00
Trenching in earth	lf	29,000	0.20	0.32
Trenching in 2″ asphalt	lf	900	0.44	1.35
Notching in asphalt	lf	13,200	0.55	1.60
Notching in concrete	lf	4,600	2.30	2.30
Install cable in trench	lf	92,000	0.10	0.11
Install cable in notch	lf	19,000	0.15	0.15
Install cable in duct	lf	17,000	0.21	0.19
Type A light base	ea	316	24.00	23.90
Type B light base	ea	49	145.00	156.00
Install type C-1 light fixture	ea	134	13.00	13.90
type C-2	ea	48	13.00	13.90
type M-1	ea	183	13.00	13.90
Night lighting vault	ls	1	7,700	8,200
Install govt-furn equipment in night lighting vault	ls	1	1,450	1,315
F&I equip in night lighting vault	ls	1	5,750	5,223
Install terminal blocks & control panels in tower	ls	1	450.00	422.00
Install control cable in tower	lf	80	2.20	1.85
Pole, class 3, 45′	ea	4	77.00	78.00
class 2, 45′	ea	1	79.00	80.00
Pole stub, 16′	ea	4	84.00	94.00
C7, 4-wire dead-end assemb	ea	1	75.00	76.00
C9-1, 4-wire circuit on single crossarm	ea	2	42.00	38.00
C30, three phase tap from three phase line	ea	1	103.00	103.00
E1, down guy assembly	ea	2	11.00	13.50
F1, anchor assembly	ea	2	24.00	23.50
E11, guy guard-wood assemb	ea	2	10.00	13.00
J13, 3-spool secondary rack	ea	4	31.00	29.50
J14, 4-spool	ea	2	22.00	20.20
M2-1 grounding assembly	ea	4	62.00	58.00
M4-1 lightning arresters 15 KV	ea	12	71.00	74.00
M3-1 curout, 15 KV	ea	15	44.00	41.60
M20 pothead installation	ea	5	410.00	425.00
ACSR primary conductor,				
no. 2	lf	3,750	0.14	0.16
no. 4	lf	1,250	0.18	0.17
RR copper 15 KV cable				
no. 2	lf	2,400	1.65	1.70
no. 4	lf	7,650	1.36	1.37
TW copper 600 volt cable				
no. 4	lf	2,550	0.28	0.29
Substation no. 1	ea	1	21,500	20,402
no. 2	ea	1	21,500	20,402
no. 3	ea	1	21,500	20,402
no. 4	ea	1	21,800	20,502
no. 5	ea	1	21,500	20,402
no. 6	ea	1	20,700	20,502
no. 7	ea	1	15,800	14,308
Rem existing prime conductor	lf	5,000	0.16	0.15
Rem & reinstall 3-wire serv	ea	4	72.00	65.00
4-wire	ea	2	91.00	81.00
Rem & reinstall street light conductor & attachments	lf	1,750	0.60	0.51
Retire existing pole	ea	3	22.00	24.00

Hot mix bituminous on runways, Phila.

Four close bids were submitted to the Philadelphia Water Department on a $133,653 contract for resurfacing at the Philadelphia International Airport. The low, contract-award bid by Union Paving Co., Philadelphia, was only 4% below the high bid and 1% below the second low.

Work consists of resurfacing runways with an aggregate-bituminous base course and surface course; a bituminous tack and seal coat; and a deslicking material. Concrete gutters will also be removed and restored.

In this area hoisting engineers are receiving $3.50 per hr; carpenters, $3.10 per hr; and common laborers, $2.175 per hr.

Bidders include:

1C	Union Paving Co., Philadelphia, Pa	$133,653
2	Asphalt Paving & Supply Co., Norristown, Pa.	135,016
4	General Asphalt Paving Co., Philadelphia, Pa.	139,011

Bids: 8-20-53 Items	Unit	Quan- tity	Unit Prices 1 C	 2
Aggr bit base crse, central plant hot-mix	t	3,500	$9.95	$9.80
Aggr bit surf crse, central plant hot-mix	t	7,300	9.95	9.95
Bit tack coat	gal	9,500	0.22	0.41
Bit seal coat.	gal	34,000	0.22	0.19

Bids. 9-1-53 Item	Unit	Quan- tity	Unit Prices 1 C	 2
Cover aggr, white	t	135	15.00	19.00
Cover aggr, other than white	t	900	11.20	10.00
Asph emulsion, applied as tack coat over surf crse	gal	1,100	0.50	0.41
Deslicking material	t	110	18.00	25.00
Restore joints in conc gutter, incl rem & haul	ea	50	15.00	20.00
Restore broken conc gutters use exist conc grating cov.	lf	200	4.50	5.00
Rem exist conc gutter, incl haul, seal of 4″ CI soil pipe & refill with dry bound macadam base crse material	lf	150	2.25	6.40

Earthwork

Cherry Valley dam, California

Guy F. Atkinson Co., San Francisco, substantially undercut six other bidders to win a $7,162,800 dam contract awarded by the San Francisco Public Utilities Commission. Atkinson was 16% below their nearest rival and entered the only bid below the engineer's estimate by H. E. Lloyd, San Francisco. The other six bids were bunched closely together, with not more than 6% and an average of less than 3% separating them.

The dam will be of earth and rockfill type with a 2,600-ft long crest and a maximum height of 320-ft. It's total volume will be 7,000,000 cu yds. Spillway excavation is also included in the project.

Skilled laborers will receive approximately $3.00 per hr; semi-skilled laborers, $2.50 per hr; and common laborers, $2.00 per hr, on the project, which started Sept. 7 and will be complete in 820 days.

Bidders include:

1C	Guy F. Atkinson Co., San Francisco, Calif.	$7,162,800
2	Winston Bros. Co. & Al Johnson Const. Co., Monrovia, California	8,567,500
7	Mittry Const. Co., Los Angeles, Calif	9,954,000
EE	H. E. Lloyd, San Francisco, California	8,117,500

Bids: 8-18-53 Item	Unit	Quan- tity	Unit Prices 1 C	 2
Foundation preparation	sg	2,500	$9.60	$20.00
Slushing	cf	6,000	6.10	5.00
Excavation, spillway	cy	100,000	2.20	3.00
Excavation, borrow areas A & D	cy	3,900,000	0.20	0.20
Excavation, quarry rock	cy	3,300,000	0.50	0.50
Embankment, zones 1 & 2	cy	3,000,000	0.40	0.40
zone 3	cy	240,000	0.91	0.80
zone 4	cy	360,000	1.15	[illegible]
zones 5 & 6	cy	3,400,000	0.72	1.10
Hand tamping	hr	3,000	8.00	6.00
Fence	lf	4,000	0.70	1.00
Clearing	ac	250	300.00	550.00
Allow for road maintenance	ls	1	50,000	50,000
Allow for control of seepage & miscell excavation	ls	1	20,000	20,000

Seawalls & piers, Michigan

Bidding was widely spaced on a $69,451 contract for sea walls and piers awarded by the city of Grosse Pointe Farms, Michigan, to Dunbar & Sullivan, Detroit, second low of seven bidders. Fifty-four percent separated the low from the high with an average of 12% separating each of the bids. The engineer's estimate by Murray M. Smith, Grosse Pointe, was 17% above the contract award bid.

Work consists of constructing 2,235 lin ft of steel-sheathed sea walls using 16-ft to 28-ft sheeting lengths and a

Continued on following page

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BUCYRUS, OHIO

Seawall, Michigan

Continued from preceding page

steel bathing-pier and boat harbor on 30-ft tie rods to 20-ft anchor piles. Fill is to be placed behind the walls.

In this area hoisting engineers are receiving $3.23 per hr; carpenters, $3.08 per hr; and common laborers, $2.28 per hr. The project will be completed in three months.

Bidders include:

1	Hilton Const. Co., Pentwater, Michigan	$62,559
2C	Dunbar & Sullivan, Detroit, Michigan	69,451
7	G. L. Towns Co., Ludington, Michigan	136,000
EE	Murray M. Smith, Grosse Pointe Farms, Mich.	81,115

Bids: 8-28-53 Item	Unit	Quan-tity	Unit Prices 1	 2 C
South sea wall	lf	330	$32.62	$48.50
South sea wall groin	lf	150	29.31	28.80
Bathing pier wall	lf	420	17.14	14.057
Bathing pier & boat harbor round piles	ea	135	30.00	42.074
Harbor entrance groins	lf	190	35.56	15.90
Short sea wall sections	lf	50	21.30	58.72
North sea wall	lf	1,095	25.87	28.845

Earth dam, North Carolina

Seven bidders competed for a $56,634 dam contract awarded by the town of Mebane, N. C. to Michael & Embrie, Durham, N. C. Piatt & Davis, Durham, N. C. are the engineers.

The contract was won by a low bid which undercut the second low by only 2% as compared to an average of 6.5% separating each of the seven bids. The low bid was 34% below the high.

The contract calls for construction of an earth dam with a concrete core-wall, intake structure, and concrete-lined hill spillway It has an elevation of 633 ft and is approximately 520-ft long. The cleaning of the reservoir site has already been completed under an earlier contract. The original location had to be shifted slightly because of a geological fault.

Bidders include:

1C	Michael & Embrie, Durham, N. C	$56,635
2	Nello L. Teer, Durham, N. C	57,914
7	C. W. Gallant, Inc., Charlotte, N. C	85,779

Bids. 7-16-53 Item	Unit	Quan-tity	Unit Prices 1 C	 2
Earth excavation	cy	27,000	$0.38	$0.41
Rock excavation	cy	200	7.00	6.00
Cl C con in core wall	cy	575	39.70	41.00
Spillway	ls	1	9,272	8,631
Intake, etc	ls	1	10,076	11,038
Rip rap	sy	800	3.50	3.00

Stone jetty & light tower, New York

Four bids entered on a $357,536 beach protection contract for Shinnecock Inlet, Long Island, New York, all fell below the engineer's estimate by the Department of Public Works, New York State. The contract award, low bid, by a combination of Edward Acker Corp. and South Shore Contracting & Dredging Corp., Patchogue, N. Y. was 32% below the engineer's projection and even the high bid was 5% below. An average of 10.3% separated each of the bids and 28% separated the low from the high.

Work consists of construction of a capstone and corestone jetty on the west shore of Shinnecock Inlet and light tower with supporting structure. The light tower will be steel with creosoted timber piles, capped with 22 gauge copper plate after being coated with pitch and creosote. The maximum diameter of the piles at the butt shall be 12 in. Foundation soil consists of soil and gravel.

Wage rates in this area include: structural iron workers, $3.66 per hr; electrical workers, $3.63 per hr; carpenters, $3.43 per hr; and common laborers, $2.20 per hr. The project will take twelve months.

Bidders include:

1C	Edward Acker Corp. & South Shore Contr. & Dredging Corp., Patchopue, N. Y	357,536
2	Northampton Const. Co., Westhampton Beach, Long island, New York	388,810
4	B. Turcamo Contr. Co., Inc., Brooklyn, N. Y.	499,902

Bids. 6-11-53 Item	Unit	Quan-tity	Unit Prices 1 C	 2
Corestone	t	24,700	$10.19	$10.90
Capstone	t	9,700	10.19	11.40
Light tower, suppt. struct & appurtenant equipment	ls	1	7,000	9,000

Streets & roads

Resurfacing, Maryland

Seven sections of highway, totaling 8.99 miles, will be resurfaced under the terms of a $194,448 contract award by the Maryland State Roads Commission to Nello L. Teer Co., Durham, North Carolina, lowest of four bidders.

Teer underbid T. B. Gatch of Baltimore by 8% to get the contract. The other bids followed closely with a spread of 13% between the high and low bids. An average of 4.4% separated each of the bids.

The work consists of constructing a bituminous concrete leveling course, wedge course, base widening course, base course, and surface course. The bituminous concrete base will be 5 in. and the surfacing, 3½ in. 21,700 tons of bituminous concrete will be used.

Minimum wage rates to be paid are: skilled labor, $1.10 per hr; semi-skilled labor, $0.90 per hr; and unskilled labor, $0.75 per hr. C. A. Skirven, Salisbury, Maryland, is the engineer.

Bidders include:

1C	Nello L. Teer Co., Durham, North Carolina	$194,448
2	T. B. Gatch & Sons, Inc., Baltimore, Md	212,147
4	Patapsco EngineeringCo., Inc., Baltimore, Md.	222,678

Bids: 8-18-53 Item	Unit	Quan-tity	Unit Prices 1 C	 2
Class 1 excavation	cy	1,850	$1.00	$1.50
Borrow excavation	cy	7,200	1.50	1.80
Stabilized shoulders	t	380	6.00	5.60
Bit conc, 1½" surface course using stone	t	4,856	....	8.60
Bit conc 1½" surface course using slag	t	4,365	8.10	8.60
Bit conc 2" surface course using stone	t	7,140	....	8.60
Bit conc surface course, 2" using slag	t	6,430	8.10	8.60
Bit conc 2" base course using stone	t	4,135	....	8.60
Bit conc 2" base course using slag	t	3,725	8.10	8.60
Bit conc 3" base course using stone	t	3,810	....	8.60
Bit conc 3" base course using slag	t	3,430	8.10	8.60
Bit conc leveling course using stone	t	1,695	....	8.60
Bit conc leveling course using slag	t	1,695	8.10	8.60
Bit conc wedge course using stone	t	2,280	....	8.60
Bit conc wedge course using slag	t	2,055	8.10	8.60
Bit material for tack coat	gal	9,160	0.30	0.40
Maintenance of traffic	ls	1	1,000	4,000

Pavements, Ohio

Only one bid was entered on a $222,243 pavement resurfacing contract awarded by the city of Lakewood, Ohio, to the Horvitz Co., Cleveland, Ohio. The Horvitz bid was 8% below the engineer's estimate by Albert S. Porter, Cuyahoga county engineer.

Pavement, totaling 6,800 sq ft will be removed and replaced with an asphalt concerte base course and surface course.

Selected spots will be done with a 9" reinforced cement concrete pavement. Materials must be transported from the asphalt plant which is seven miles from the job.

Wage rates on the project include: skilled labor, $3.00 per hr; semi-skilled labor, $2.40 per hr; and common labor, $2.27 per hr. The job began on August 10 and will be completed by November 4.

Bidders include:

1C	Horvitz Co., Cleveland, ohio	$222,243
EE	Albert S. Porter, Cuyahoga county engineer	243,000

Bids: 8-3-53 Item	Unit	Quan-tity	Unit Prices EE	 1 C
Remove & displace block	sy	6,500	$1.00	$1.00
Rem & displace bit cover	sy	5,300	1.00	1.00
Rem & disp asph patch mat	sy	200	0.50	0.50
Rem & displace sidewalk	sy	6,850	0.15	0.10
Rem & disp conc base	sy	200	2.55	2.55
Rem & disp block pvmnt	sy	240	3.75	3.75
Chipping conc pvmnt	sy	150	2.50	2.50
Chipping stone curb	lf	3,100	0.25	0.25
Asph conc header	lf	50	0.90	0.90
Rem & disp rails, frogs, etc	lf	950	0.35	0.35
Filling rail & flange groove	lf	63,500	0.05	0.05
Reset catch basin catngs	ea	122	30.00	25.00
Reset MH castings	ea	220	40.00	25.00
Reset monument boxes	ea	90	30.00	25.00
Reset water valve boxes	ea	200	35.00	25.00
SDS #32 frame	ls	1	70.00	70.06
SDS #29 cover	ls	1	20.00	20.00
SDS #9 & #28 frame & cover	ls	1	65.00	65.00
SDS #36-B monument box	ls	1	30.00	30.00
Water valve box, any type	ls	1	45.00	45.00
Str stone curb, reset	lf	200	1.50	1.50
Str stone curb, replaced	lf	1,500	4.50	4.00
Str stone curb, set as circular curb	lf	200	6.00	6.00
4½" conc sidewalk	sf	6,850	0.45	0.45
Car track drains abandoned	ea	62	10.00	10.00
2½" asph conc surface	cy	7,300	15.40	14.60
Asph conc leveling crse	cy	3,250	15.40	14.60
Asph conc base course	cy	910	17.00	14.60
Bituminous tack coat	gal	10,500	0.30	0.16
Sand	t	275	4.50	4.50
Cmt conc base, replace	cy	70	20.00	16.06
Side approach material	sy	30	0.80	0.80
9" reinf cmt conc pvmnt	sy	240	8.00	8.00
4" insulation course	sy	240	1.00	0.80
Bit precoated sand	t	130	10.00	8.00
Air compressor	hr	40	5.75	3.50
Treuck	hr	25	5.00	4.00
Skilled labor	hr	40	3.75	3.50
Intermediate labor	hr	80	2.85	2.75
Unskilled labor	hr	130	2.35	2.35
Barricades, danger & warning signs	ls	1	1,368	878.00

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CURBS and GUTTERS
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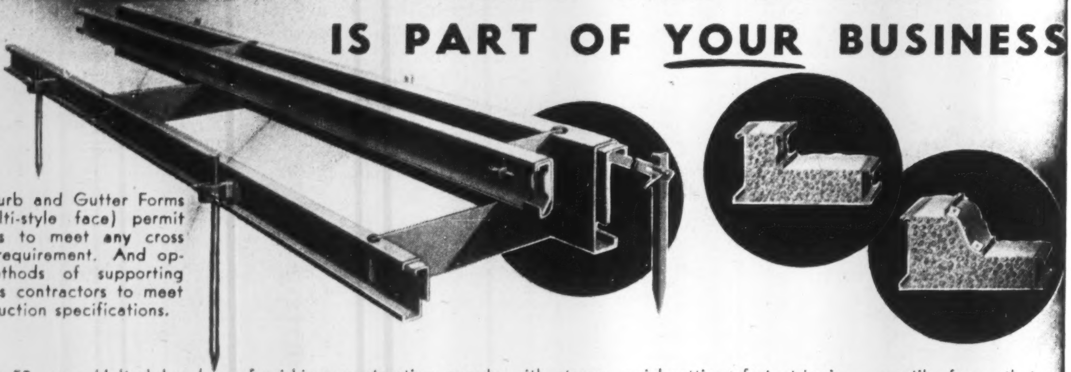
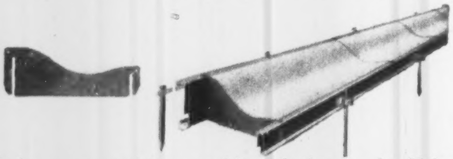
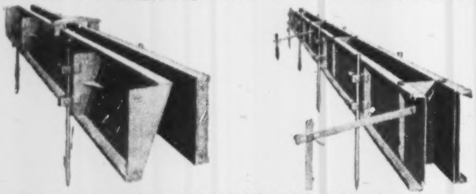


Heltzel Curb and Gutter Forms (with multi-style face) permit contractors to meet **any** cross sectional requirement. And optional methods of supporting face allows contractors to meet **any** construction specifications.

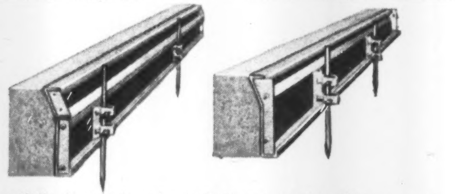
For almost 50 years Heltzel has been furnishing construction people with strong, quick-setting, fast stripping, versatile forms that make concrete forming easier, faster and less expensive.
On this page is a sampling from the world's most complete line of modern steel forms . . . designed and built by the nation's leading manufacturer of forms for concrete construction.



Two of the many variations possible with the popular **Helco Basic Forms.** These forms are designed to permit contractors to work an almost endless variety of curbing styles from the same basic set. All **Helco Basic Forms** are made of long lasting tough carbon manganese steel in 10' sections.



For curb work 12" to 24" in height, Heltzel has designed a **heavy duty dowel joint form** that has found ready acceptance in the field.



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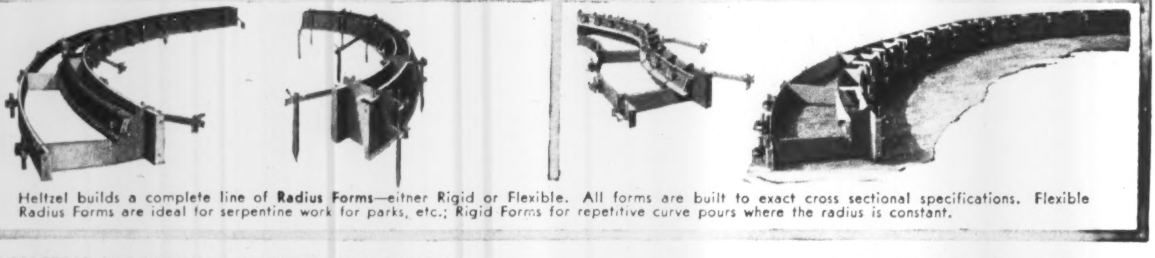

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CONTRACTORS AND MUNICIPAL ENGINEERS: Today's high labor costs make the use of steel forms almost a necessity. You'll find that Heltzel can provide by far the widest variety of either standard or special forms.

If you don't already have Heltzel Form Bulletin L-20, get your copy today by writing **The Heltzel Steel Form and Iron Company, Warren, Ohio.**

—Naturally It's A— Heltzel Flex-Plane —Product—

Logging road, Montana

A contract for clearing, grubbing, draining and grading 6.5 miles of forest road was awarded by the Bureau of Public Roads, Department of Commerce, to Francis H. Holland, Billings, Montana, lowest of five bidders. The bidding was widely spaced with 31% separating the high bid from the low and an average of 8.8% separating each of the bids. M. E. Martin, West Glacier, Montana, is the engineer.

The project begins at an approximate elevation of 4,200 ft and climbs to about 6,200 ft. Near the upper end, it crosses several small canyons where annual snow slides occur from the precipitous slopes above. This area, near the west boundary of Glacier National Park and the Canadian border, is isolated and surrounded by high mountains.

The job is one of a group of forest development road projects being constructed in western Montana and northern Idaho for control by logging of a widespread spruce bark-beetle infection.

A portion of the total program is being executed by timber operators to reach purchased timber. The other portion is being financed by U. S. Forest Service through the U. S. Bureau of Public Roads.

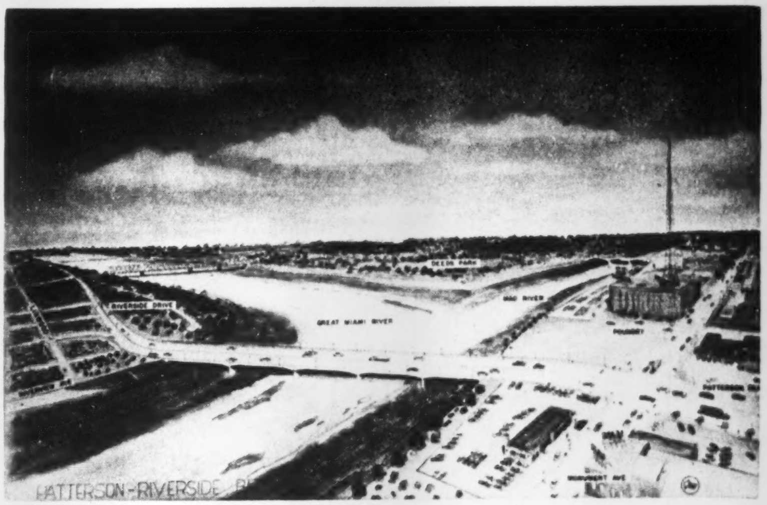
Equipment and supplies must be transported 44 miles over unimproved road of which 37 miles are under construction. Other side road and aluminum plant construction in the area complete for labor, especially heavy equipment operators. This complicates the problem of obtaining and holding sufficient forces to complete the project within the stipulated 180 calendar days.

Minimum wage rates on the project are: skilled labor, $1.96 to $2.60 per hr; semi-skilled labor, $1.88 to $2.26 per hr; and common labor, $1.70 per hr.

Bidders include:

1C	Francis H. Holland, Billings, Montana	$113,117
2	Ed Tangmo, Milltown, Montana	118,889
5	Tirrell & Co., Missoula, Montana	163,610

Bids: 7-31-53 Item	Unit	Quantity	Unit Prices 1 C	2
Extra & miscellaneous force account work	ls	1	$1,000	$1,000
Clearing & grubbing	ac	45	600.00	740.00
Selective removal trees & snags	sf	100	5.00	5.00
Solid rock excavation	cy	7,000	1.10	1.10
Common excavation	cy	86,000	0.40	0.40
Uncl exc for structures	cy	250	3.00	3.00
Uncl exc for borrow, case 1	cy	36,000	0.50	0.40
Overhaul (1,000′ freehaul)	stay	200,000	0.02	0.02
Spec overhaul borrow (1000′ free haul)	cymi	10,000	0.20	0.30
Foundation fill	cy	75	5.00	3.50
Watering of subgrade	unit	1,700	1.00	1.50
Provide & maintain water plant	ls	1	500.00	2,222
Corr galv sh met culv pipe				
18″	lf	1,040	5.00	4.50
24″	lf	416	8.00	7.00
36″	lf	76	14.00	12.00
103″x71″ str plate pipe arch	lf	60	80.00	90.00
8″ perf corr galv sh met pipe underdrain	lf	200	3.00	3.00



SIX-LANE, STEEL-GIRDER Patterson-Riverside bridge, Dayton, Ohio.

Bridges

Steel-girder bridge, Ohio

The Patterson-Riverside bridge, a 670-ft, steel-girder span with a reinforced concrete deck, will be constructed by the Maxon Const. Co. for the city of Dayton, Ohio. Maxon's $1,044,629 bid was the lowest of eight, falling below the second low by only 2%.

All bids except the high were below the engineer's estimate by John F. Hale, city engineer, and Carl F. Shultheis, chief engineer, Dayton Bureau of Structures.

Five spans, two 116-ft long and three 145.5-ft long, will cross the Great Miami River. There will be two 22-ft roadways, two 7-ft sidewalks, and a 4-ft mountable median strip.

The project also includes 850 lin ft of 44-ft wide concrete pavement with median strip, curb, sidewalk and drainage on the north approach.

The bridge was originally designed as a six-lane structure. Due to lack of funds, it was modified so that it now consists of six-lane piers and abutments with a four-lane superstructure. The superstructure will be widened to a full six lanes when funds are available.

Skilled workers on this project are receiving $3.11 per hr; semi-skilled workers, $2.50 per hr; and common laborers, $1.80 per hr.

The job will be completed in 385 working days.

Bidders include:

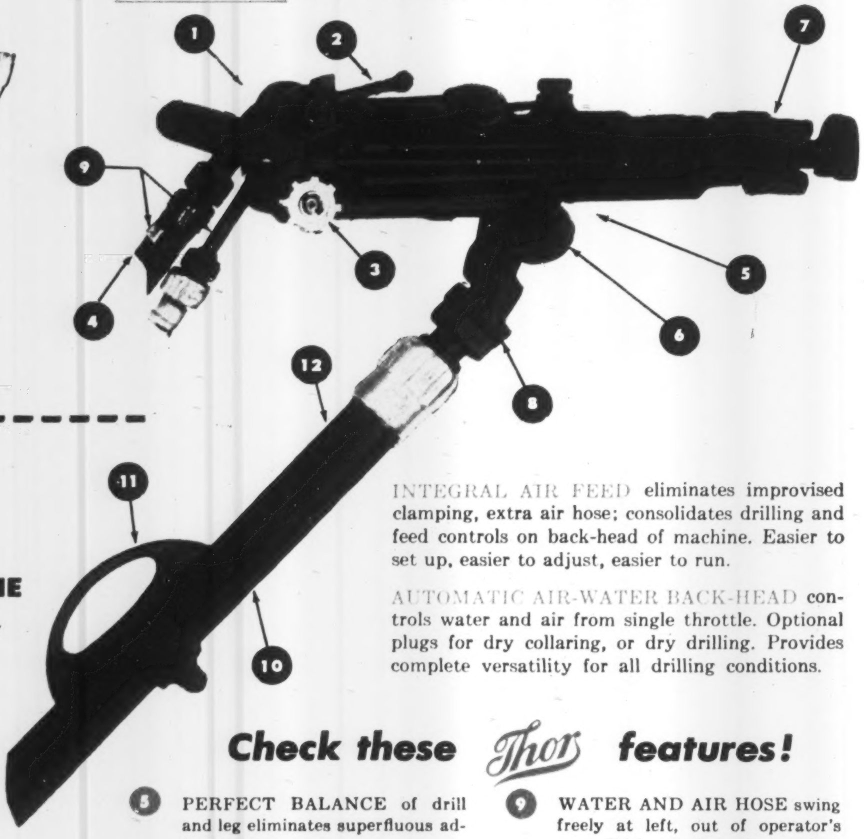
1C	Maxon Const. Co., Dayton, Ohio	$1,044,629
2	Bates & Rogers, Chicago, Illinois	1,068,639
8	Penker Co., Cincinnati, Ohio	1,227,920
EE	City engineer, Dayton, Ohio	1,209,765

Bids. 8 20 53 Item	Unit	Quantity	Unit Prices 1 C	2
Roadway				
Roadway excavation	cy	2,091	$3.00	$1.50
Excavation for struct	cy	244	1.50	1.50
Borrow	cy	4,751	1.00	1.50
Rem & dispose of existing conc pvmnt driveways	sy	4	3.00	5.50
Rem & dispose of existing stone block curb	lf	1,447	0.40	0.55
Rem & dispose of existing 4″ conc sidewalk	sf	7,288	0.10	0.10
Remove trees & stumps	ls	1	1,500	1,100
Conc, cl C for structures	cy	82	80.00	75.00
cl E	cy	55	60.00	30.00
Water-proofing, type B	sy	2	10.00	4.50
Premolded sealing strip	lf	29	1.00	4.00
Reinforcing steel	lb	4,173	0.15	0.14
Premolded expansion joint filler	sf	31	1.00	1.00
Pipe handrail	lf	35	6.00	7.30
Structural handrail	lf	249	30.00	18.00
Electric equipment as per plan	ls	1	2,000	4,000
Porous backfill	cy	65	5.00	5.00
4″ concrete sidewalk	sf	14,348	0.40	0.40
6½″ reinforced concrete sidewalk	sf	420	1.00	0.65
3″ top soil	sy	7,706	0.50	0.25
Commercial fertilizer (10-6-4 mix) 20 lbs. per 1,000 sf	t	0.69	100.00	130.00
Seed	sy	3,286	0.20	0.11
Sod	sy	4,420	0.50	0.45
Pavement				
Stabilized base course	cy	342	4.00	3.50
Asph conc leveling crse	cy	5	17.00	17.00
Bit tack coat	gal	15	1.00	1.00
Asph conc surf crse, type C	cy	5	17.00	17.00
PC conc pavement, 8″	sy	4,354	5.00	6.40
PC conc driveways, 6″	sf	76	1.00	0.75
PC conc pvmnt alley mouths, 7″	sy	32	7.00	5.00
Reinf conc approach slab	sy	160	13.00	10.00
PC conc comb curb & gutter	lf	895	2.50	2.15
PC conc str curb	lf	3,346	2.50	2.15
Medium curing liquid asph	gal	1,222	0.30	0.25
Drainage				
Std str RC culv pipe for storm sewers, 12″	lf	215	4.00	3.50
15″	lf	50	5.00	4.00
18″	lf	137	6.00	5.00
Std RC pipe, for storm sewers,				
18″	lf	166	6.00	5.00
24″	lf	266	8.00	8.00
30″	lf	265	12.00	11.00
Std str RC culv pipe for storm sewers, 30″	lf	400	14.00	18.00
Drain tile pipe for roadway drainage, 4″	lf	41	2.00	2.50
Vitrified pipe for roadway drainage, 3″	lf	28	2.50	2.00
6″	lf	312	3.00	2.00
3″ (90° bends) pipe spec	ea	4	5.00	6.00
Eddy parallel seat, double gate valve flanged ends with key or equal, 30″	ea	1	1,800	2,200
6″ yard drains inlets	ea	6	20.00	10.00
Std city of Dayton catch basins type "A"	ea	8	300.00	165.00
type "D"	ea	4	250.00	165.00
Std city of Dayton storm MH, type "A"	ea	8	200.00	165.00

Continued on following page

A NEW ONE-MAN DRILLING MACHINE

with integral air-leg feed and automatic air-water back-head



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No. 380

AUTOMATIC DRILLING MACHINE

With Aluminum Cylinder and Piston

TOTAL WEIGHT 80 LBS.
36" OR 48"
FEED

INTEGRAL AIR FEED eliminates improvised clamping, extra air hose; consolidates drilling and feed controls on back-head of machine. Easier to set up, easier to adjust, easier to run.

AUTOMATIC AIR-WATER BACK-HEAD controls water and air from single throttle. Optional plugs for dry collaring, or dry drilling. Provides complete versatility for all drilling conditions.

Check these Thor features!

① CONTROLS conveniently grouped on back-head for safe, convenient operation.

② EXCLUSIVE SIX POSITION THROTTLE VALVE . . . from complete shut-off of air and water, to full air and water in logical steps for full control and convenience.

③ AIR LEG CONTROL KNOB conveniently located for natural, right-hand operation. Exclusive instantaneous push-button release for safety.

④ SINGLE AIR HOSE supplies air to drill and to leg (through drill and mounting swivel).

⑤ PERFECT BALANCE of drill and leg eliminates superfluous adjustments.

⑥ HINGE JOINT between drill and leg has tension adjustment. Exclusive extra-large friction disc holds selected tension indefinitely.

⑦ CONSTANT BLOWING ACTION cleans holes of cuttings, keeps cuttings out of chuck and drill.

⑧ FOR USE AS SINKER, air leg can be easily detached by loosening one nut.

⑨ WATER AND AIR HOSE swing freely at left, out of operator's way. Exclusive fastening method eliminates possibility of connections loosening or leaking.

⑩ EXCLUSIVE 2¼" DIAMETER FEED LEG provides added pressure to keep bit on face for longer life, especially when tungsten carbide bits are used.

⑪ EXCLUSIVE NEW HOLDING HANDLE provides greater safety. Conventional spade handle optional.

⑫ EXCLUSIVE SCRAPER RING on piston rod prevents solids from entering cylinder. "O" ring seal repels liquids.

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Bridge, Ohio

Continued from preceeding page

Bids. 8-20-53

Item	Unit	Quantity	Unit Prices 1 C	2
Storm sewer manholes, abandoned	ea	3	50.00	50.00
Sanitary sewer manholes adjusted to grade	ea	4	50.00	50.00
Existing catch basins, abandoned	ea	5	40.00	40.00
Existing inlets, abandoned	ea	3	20.00	25.00

Structure

Item	Unit	Quantity	1 C	2
Cofferdams, cribs, sheeting & flood protection	ls	1	65,000	70,000
Exc for structures, dry	cy	1,327	3.00	6.00
Exc for structures, wet	cy	2,858	3.00	6.00
Exc for revetments, dry	cy	192	3.00	4.50
Exc for revetment footings, dry	cy	40	3.00	12.50
Cl C conc superstructure	cy	1,309	85.00	68.00
Cl E conc substructure (piers above footing)	cy	2,598	30.00	36.50
Cl E conc footings (piers, abutments & wingwalls)	cy	1,334	25.00	23.00
Cl C conc substructure (abut backwall, levee, wingwalls)	cy	128	65.00	70.00
Cl E conc footing (revetments)	cy	40	55.00	30.00
Waterproofing, type C (bridge deck)	sy	3,324	0.80	0.20
Waterproofing, type B (abutment backwall)	sy	70	2.00	4.00
Waterproofing, premolded sealing strip	lf	28	1.00	6.00
Reinforcing steel	lb	413,128	0.12	0.14
Structural steel	lb	2,502,589	0.18	0.185
Field painting str stl	lb	2,502,589	0.004	0.005
Premolded expansion joint filler, ½"	sf	190	1.00	1.00
Railing (steel)	lf	1,436	25.00	18.00
First test pile	ls	1	2,000	500.00
Bearingpiles, 14" BP 74 piers	lf	10,080	5.50	6.00
10" BP 42 abutments	lf	2,310	3.75	4.00
Traffic control MH & conduits	ls	1	1,000	1,300
Porous backfill	cy	184	5.00	6.00
6" corr met drain pipe, perforated	lf	215	1.50	2.00
Asph conc surf crse	cy	113	17.00	17.00
Asph conc leveling crse	cy	159	17.00	17.00
Riprap, type A, revetment	sy	694	5.00	7.00
RC steps to river bed	lf	102	10.00	10.00

Unclassified

High-low-average unit bids

To sharpen both its cost estimating pencils and its judgment of bid prices, the San Francisco District Office of the U. S. Army Corps of Engineers compiles the comprehensive analysis of unit bids shown here. In addition, the estimates section computes its own heavy construction bid price index, based on these unit prices and report in the cost index section of these pages. Colonel George H. Walker is district engineer in charge of this work.

These are unit prices bid for heavy construction and underground utilities in the western United States (west of Denver), during the first half of 1953. They are obtained by analysing the three low bids on significant projects throughout the area.

Since each job is different and unit prices reflect these differences, the district engineers recommend shading the averages up or down within these ranges to fit conditions that produce high-cost or low-cost work.

Bid prices by groups for the first half of 1953 and average prices for the two halves of 1952 include:

First prestressed-concrete bridge in Alaska

The $145,958 Eyak River Bridge scheduled for construction at Cordova, Alaska, will be the first prestressed-concrete bridge in that possession. Hugh A. Stoddart, Juneau, Alaska, is the engineer.

The bridge will be 254.96-ft long with seven 30-ft spans and one 45-ft span. The roadway will be 24-ft wide.

Treated timber caps and piling will comprise the substructure. Precasting of lab units, which vary from 16,400 lbs to 27,600 lbs, can be done at any location.

Minimum wage rates to be paid are: skilled labor, $3.475 per hr; semi-skilled labor, $3.145 per hr; and common labor, $3.095 per hr. Work started on Sept. 15 and will be completed about July 15, 1954.

Proposal A

1C	M. P. Munter Co., Seattle, Washington	$148,575
2	Lytle-Green-Birch, Seattle, Washington	158,800
3	J. J. Badraun Co., Seattle, Washington	176,824

Bids: 8-11-53

Item	Unit	Quantity	Unit Prices 1 C	2
Uncl excavation	cy	4,400	$4.00	$4.80
Uncl exc for borrow, cse 1	cy	15,000	2.00	1.64
Spec overhaul of borrow (1,000' freehaul)	cymi	16,000	0.35	0.24
Conc Class A	cy	164	200.00	190.00
Reinforcing steel	lb	28,100	0.24	0.21
Str stl (carbon) furnished, fabricated & erected	lb	30,500	0.36	0.34
Metal handrail	lf	526	8.00	9.00
Tr timber, creo preserv	mfbm	40.3	500.00	568.00
Pile shoes	ea	17	30.00	15.00
Furn tr timber piling	lf	3,650	2.65	2.00
Drive tr timber piling	ea	74	90.00	239.00
Rem & disp existing bridge	ls	1	3,650	8,944

Proposal B

1C	M. P. Munter Co., Seattle, Washington	$145,958

Bids: 8-11-53

Item	Unit	Quantity	Unit Prices 1 C
Uncl excavation	cy	4,400	$4.00
Uncl exc for borrow, cse 1	cy	15,000	2.00
Spec overhaul of borrow (1,000' freehaul)	cymi	16,000	0.35
45' precast interior slab units	ea	8	1,700
exterior	ea	2	2,000
30' precase interior slab units	ea	28	1,300
exterior	ea	14	1,325
Metal hand rail	lf	515	8.00
Tr timber creo preserv	mfbm	6	500.00
Pile shoes	ea	17	30.00
Furn tr timb piling	lf	2,750	2.65
Drive tr timber piling	ea	56	90.00
Rem & disp existing bridge	ls	1	3,650

Unit prices analysed on western jobs

U. S. Army Corps of Engineers, San Francisco District

Base courses, bituminous surfaces, etc.

Item Description	No. Jobs	Unit	Unit Prices Jan.-June 1953 High	Low	Average	Previous averages 1952 July-Dec.	1952 Jan.-June
Imported select material	101	t	4.41	0.44	1.60	1.43	1.69
Crushed rock base course	228	t	6.83	0.46	2.80	3.18	2.60
Plant mix aggregate	66	t	9.73	2.53	5.99	5.25	5.51
Stabilized aggregate	109	t	7.63	1.82	4.86	3.56	......
Cover aggregate	134	t	11.00	2.50	6.37	6.62	4.06
Cover sand	33	t	10.50	1.50	5.37	6.43	5.40
Paving asphalt	94	t	42.00	11.00	24.00	24.60	24.34
Asphalt SC	190	t	70.00	22.00	38.00	36.60	33.23
Asphalt MC	74	t	60.00	26.00	41.00	39.00	35.71
Asphalt RC	21	t	60.00	32.00	44.00	48.00	40.32
Seal coat asphalt emulsion	118	t	79.00	32.00	48.00	51.00	46.29
Asphalt paint binder	33	t	87.00	36.00	51.00	52.00	......
Armor coat	6	sy	0.29	0.07	0.18	......	......
Asphalt concrete 2" thick	13	sy	1.80	0.17	0.71	1.19	2.62
Asphalt concrete 3" thick	1	sy	......	......	1.35	2.17	......
Asphalt concrete 4" thick	3	sy	1.89	1.80	1.85	2.91	2.69
Asphalt concrete 6" thick	12	sy	2.71	1.88	2.28	4.65	......
Asphalt concrete	152	t	12.00	3.95	7.43	7.78	6.14
Filter material	47	cy	10.33	1.42	5.38	6.45	4.61
Road mixing	57	sy	0.40	0.07	0.22	0.23	0.16
Cement treated base	2	sy	0.28	0.22	0.25	0.70	0.42
Right-of-way markers	81	ea	12.16	3.08	7.65	8.05	......
Guide post	78	ea	16.67	4.00	7.63	6.82	7.24
Right-of-way fence	39	lf	0.79	0.26	0.41	0.45	0.33
Drive gate	37	ea	379.00	37.00	106.00	88.00	93.00
Chain link fence	45	lf	7.27	1.12	2.34	2.40	2.43
Guard rail, wood	12	lf	3.91	0.58	2.04	3.63	......
Guard rail, steel	94	lf	12.00	1.73	5.17	5.17	4.17
Guard rail, pipe	14	lf	7.43	2.57	5.46	5.50	5.68

Compared with last six (6) months of 1952: Increases in 8 Items Decreases in 21 Items

Portland cement concrete

Item Description	No. Jobs	Unit	Unit Prices Jan.-June 1953 High	Low	Average	Previous averages 1952 July-Dec.	1952 Jan.-June
Structural concrete (steel not included)	285	cy	143.00	25.00	71.00	73.20	75.81
Reinf. steel in place	186	lb	0.25	0.08	0.137	0.146	0.143
Reinf. steel, furnish only	7	lb	0.09	0.05	0.057	0.088	0.06
Foundation concrete	42	cy	73.00	14.00	34.00	28.55	39.36
Curb and gutter concrete	61	cy	87.00	23.00	44.00	41.20	41.81
Curb and gutter concrete	93	lf	3.77	1.25	2.07	2.18	2.11
Curb only, concrete	51	lf	2.45	0.60	1.48	1.80	1.48
Gutter only, concrete	15	lf	2.63	0.44	1.49	1.62	1.54
Pavement concrete	35	cy	42.00	9.00	19.00	28.88	18.97
Canal lining concrete	9	cy	50.00	15.00	31.00	32.05	33.25
Pipe bed concrete	67	cy	58.00	12.37	31.93	30.56	25.47
Sidewalk 3½" thick	27	sf	0.43	0.26	0.37	0.37	0.34
Sidewalk 4" thick	52	sf	0.65	0.29	0.40	0.43	0.39
Pavement 5" thick	5	sf	0.47	0.35	0.40	0.58	......
Pavement 6" thick	37	sf	0.73	0.27	0.52	0.68	0.51
Pavement 8" thick	12	sf	1.27	0.41	0.67	0.60	0.66
Rubble masonry	4	cy	56.00	21.00	35.00	24.50	35.00
Sacked concrete riprap	17	cy	42.00	25.00	34.00	35.82	36.75
Grouted riprap	7	cy	29.00	17.00	21.00	30.11	......
Remove concrete	84	cy	34.00	2.25	9.62	14.15	11.66
Remove pavement	10	cy	14.83	1.30	5.83	4.63	......
Portland cement	93	bbl	8.43	3.22	4.83	4.77	4.63

Compared with last six (6) months of 1952: Increases in 7 Items Decreases in 14 Items

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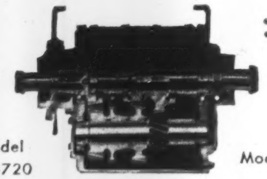
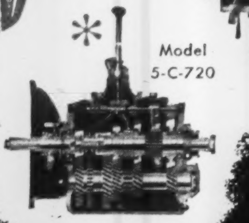


Model 3-A-65



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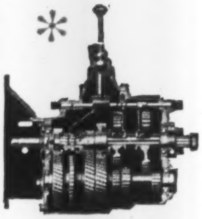

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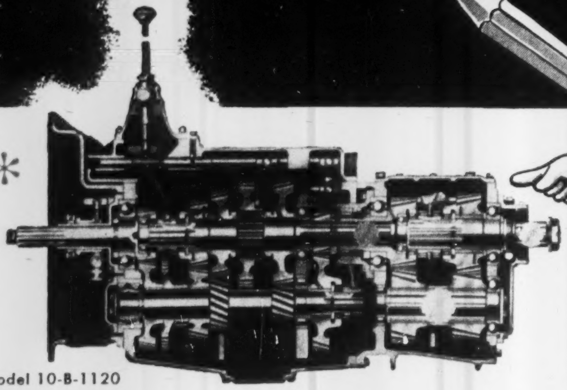

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Subway tracks, New York

Tully & DiNapoli, Inc., Jamaica, N. Y., were awarded a $406,321 contract by the New York City Transit Authority for track construction in a connection between the Queens Boulevard IND line and the 60th St. BMT tunnel in Queens. James H. Griffin is the chief engineer for the transit authority. The Tully & DiNapoli bid was the lowest of three, falling 6% below the second low bid, and 17% below the high.

The job includes supplying materials, installing tracks, installing contact rails and special work for 1.5 miles of subway.

Approximate wage rates for the one-year project are: skilled labor, $3.40 per hr; semi-skilled labor, $2.90 per hr; and common labor, $2.05 per hr.

Bidders include:

1C	Tully & DiNapoli, Inc., Jamaica, N. Y.	$406,321
2	Watson-Flagg Engineering Co., New York	433,981
3	Wagner-Larsen Const. Co., Inc., Brooklyn	492,441

Bids. 8-7-53 Item	Unit	Quantity	Unit Prices 1 C	2
Conc msry in place	cy	2,700	$23.00	$28.00
F&I anticreepers	ea	2,500	1.00	0.70
Cutting concrete	cf	30	15.00	20.00
F&I CI frames, covers & gratings	t	3	700.00	700.00
Install type I track on tan & curves 3000-ft radius	lf	170	10.00	8.00
on curves 1000 to 2300-ft radius	lf	60	13.00	8.50
on curves less than 500-ft radus	lf	115	14.00	9.50
Remove ballasted track	lf	220	4.00	4.00
Install track rails at special locations	lf	550	4.00	3.50
remove	lf	250	3.00	1.50
Install type II track on tan & curves 3000-ft radius	lf	1,800	4.00	6.00
on curves 1000 to 2300-ft radius	lf	500	7.00	7.50
on curves 500 to 1000-ft radius	lf	950	8.00	9.50
on curves less than 500-ft radius	lf	3,300	8.50	9.70
Remove type II track	lf	300	40.00	45.00
F&I CI drain pipes, cl A				
3"	lf	90	5.00	4.00
4"	lf	30	6.00	5.00
6"	lf	10	8.00	7.00
8"	lf	25	10.00	8.00
F, D & spread broken stone ballast, for class A	cy	410	9.00	10.00
F&I conduits, 4" fibre	cnf	85	7.00	10.00
2" metal	cnf	500	3.30	3.30
F&D joint bars, type E	ea	600	3.00	3.00
type F	ea	360	3.00	3.20
type G	ea	360	3.00	2.60
F&D end inclines, right hand	ea	25	20.00	20.30
left hand	ea	26	20.00	20.30
F&D cut spikes	lb	55	12.00	12.00
F&D screw spikes, type A	lb	260	20.00	16.00
type E	lb	110	20.00	16.00
F&D galv lag screws, 4" long ⅝ diameter	lb	12	40.00	40.00
Bolts & nuts, type A	ea	50	5.00	3.00
type C	ea	1,700	2.00	1.50
type E	ea	2,600	1.00	0.70
type D	ea	10,400	1.00	1.15
type M	ea	26	2.00	4.00
Sheathing bolt, ¾" long, ½" diameter	lb	18	100.00	40.00
F&D rail braces	ea	2,300	2.00	2.10
F&D tie plates rolled stl A	ea	600	1.00	0.75
type B	ea	165	1.50	1.35
type C	ea	28	1.50	1.50
type D	ea	115	2.00	1.70
type A1	ea	80	1.50	1.30
type B1	ea	40	1.50	1.70
type B2	ea	16	2.00	1.70
type E	ea	3,000	1.00	0.85
type E1	ea	500	1.50	1.25
type E2	ea	28	1.00	0.85
type F	ea	1,200	1.50	1.20
type G	ea	1,000	1.50	1.20
type H	ea	1,000	1.50	1.55
F&D tie pads, 7¾" wide sisal-fibre, 6¾" long	ea	12	0.50	0.55
9¼" long	ea	1,050	0.50	0.65
11 11/16" long	ea	145	0.50	0.75
13⅞" long	ea	210	0.50	0.85
14⅛" long	ea	75	0.50	0.85
15¼" long	ea	65	1.00	0.90
18¾" long	ea	75	1.00	1.20

Continued on following page

Average unit bids, Far West

Continued from preceding page

Base courses, bituminous surfaces, etc.

Drainage pipe—corrugated metal
Usually lightest gage permissible for diameter

Item Description	No. Jobs	Unit	Unit Prces Jan.-June 1953 High	Low	Average	Previous averages 1952 July-Dec.	1952 Jan.-June
6" in place	6	lf	3.66	1.50	2.11	3.19	2.30
8" in place	34	lf	4.23	1.93	2.61	2.68	2.69
10" in place	12	lf	6.05	2.97	4.06	3.88	4.00
12" in place	62	lf	6.00	2.50	3.61	3.85	3.65
15" in place	21	lf	6.71	3.03	4.37	4.53	4.53
18" in place	89	lf	7.75	3.20	4.62	4.87	4.60
24" in place	76	lf	10.52	4.58	6.46	6.53	6.16
30" in place	41	lf	14.08	6.08	8.12	9.00	7.90
36" in place	49	lf	20.33	9.25	12.20	11.50	11.48
42" in place	11	lf	22.29	11.45	15.35	14.43	13.32
48" in place	25	lf	24.33	13.50	17.14	17.85	17.35
54" in place	11	lf	38.50	17.00	25.83	20.57	24.25
60" in place	5	lf	26.00	18.34	22.55	29.75	27.75
66" in place	1	lf	......	......	32.27	......	36.75
72" in place	7	lf	51.17	27.83	36.77	42.82	36.44
8" perforated, in place	36	lf	4.10	1.83	2.43	3.04	2.85
CMP arch (small)	38	lf	11.00	3.78	6.58	6.84	5.56
CMP arch (large)	17	lf	30.00	8.67	17.80	18.22	10.64

Compared with last six (6) monhs of 1952: Increases in 4 Items
Decreases in 13 Items

Drainage pipe concrete

Plain concrete

Item Description	No. Jobs	Unit	High	Low	Average	1952 July-Dec.	1952 Jan.-June
6" in place	4	lf	4.00	2.10	2.96	2.40	2.68
8" in place	8	lf	5.77	1.95	3.21	3.02	2.95
10" in place	13	lf	5.82	1.95	3.29	3.27	2.90
12" in place	22	lf	6.50	1.37	3.42	3.64	3.43
15" in place	10	lf	9.13	2.28	5.25	3.44	4.95
18" in place	13	lf	10.72	2.46	5.55	4.92	4.95

Reinforced concrete

Item Description	No. Jobs	Unit	High	Low	Average	1952 July-Dec.	1952 Jan.-June
10" in place	5	lf	5.33	1.93	3.52	3.79	3.43
12" in place	57	lf	8.48	2.13	4.38	4.52	3.46
15" in place	36	lf	9.67	3.02	5.18	5.61	5.54
18" in place	65	lf	12.90	3.60	6.25	5.83	5.50
21" in place	27	lf	13.28	4.68	7.62	7.47	6.59
24" in place	60	lf	14.75	5.34	8.22	8.27	7.45
27" in place	23	lf	16.97	6.30	10.25	10.57	9.86
30" in place	60	lf	17.53	6.15	10.84	10.23	9.50
33" in place	8	lf	17.60	9.13	13.20	16.47	11.57
36" in place	42	lf	20.78	10.22	13.94	13.27	14.33
42" in place	26	lf	20.00	11.75	15.88	16.91	15.54
48" in place	36	lf	32.48	16.21	22.27	21.27	20.32
54" in place	7	lf	30.93	21.40	27.46	25.85	23.40
60" in place	12	lf	42.68	23.50	32.48	34.41	28.44
72" in place	12	lf	69.38	37.32	60.76	43.86	33.00

Compared with last six (6) months of 1952: Increases in 12 Items
Decreases in 9 Items

Piling

Item Description	No. Jobs	Unit	High	Low	Average	1952 July-Dec.	1952 Jan.-June
Furnish green wood	6	lf	1.35	0.71	1.01	1.09	1.10
Furnish treated wood	6	lf	2.08	1.58	1.77	1.93	2.03
Furnish precast concrete	24	lf	4.60	1.56	3.30	3.78	3.38
Furnish sheet piling	3	sf	2.87	2.73	2.81	......	......
Furnish steel	7	lf	4.97	3.10	3.88	3.95	2.97
Drive wood	10	ea	178.00	31.00	76.60	57.00	......
Drive concrete	23	ea	485.00	31.00	124.00	153.00	88.00
Drive steel	7	ea	213.00	58.00	127.00	93.00	55.00
Steel pile splice	9	ea	68.00	30.00	40.00	29.00	32.00
Concrete in place (Raymond)	3	lf	4.96	4.83	4.90	......	5.45
Concrete in place precast	1	lf	......	......	5.33	5.98	5.25
Steel in place	1	lf	......	......	10.59	8.94	10.62

Steel and timber construction and railroad

Item Description	No. Jobs	Unit	High	Low	Average	1952 July-Dec.	1952 Jan.-June
Timber, treated, in place	14	mbm	687.00	275.00	403.00	363.00	381.00
Timber, untreated, in place	17	mbm	403.00	202.00	308.00	305.00	320.00
Redwood	3	mbm	342.00	316.00	330.00	305.00	......
Miscl. metal, in place	75	lb	0.87	0.24	0.47	0.51	0.50
Structural steel, in place	34	lb	0.60	0.11	0.34	0.29	0.28
R.R. track	7	tf	15.33	6.40	10.83	8.68	......
R.R. turnouts	2	ea	2,743.00	2,424.00	2,584.00	2,379.00	......
R.R. ballast	2	t	2.58	2.00	2.29	2.95	......
R.R. ties	4	ea	8.45	4.02	6.28	......	......
Switch ties	2	ea	13.00	12.55	12.77	......	......
Switch ties	2	set	375.00	362.00	368.50	......	......

Compared with last six (6) months of 1952: Increases in 10 Items
Decreases in 8 Items

Equipment rental

Item Description	No. Jobs	Unit	High	Low	Average	1952 July-Dec.	1952 Jan.-June
Bulldozer	10	hr	18.67	8.80	13.30	13.80	10.57
3.5–4.5 CY dump truck	2	hr	5.06	4.53	4.79	5.61	4.75
5 cy dump truck	4	hr	5.93	5.36	5.52	5.94	5.42
6 cy dump truck	2	hr	7.67	5.93	6.80	7.43	7.25
Clamshell—¾ cy	1	hr	......	......	13.67	......	......
Water tank truck	2	hr	8.50	5.02	6.76	......	......
Shovel—truck ¾ cy	4	hr	17.08	12.00	14.63	14.63	......
Carryall and tractor	1	hr	......	......	15.33	14.66	13.82
Tractor only	7	hr	14.00	8.90	11.95	11.16	9.90
Sheepfoot and tractor	7	hr	18.33	13.55	15.14	11.15	......

Landscaping

Item Description	No. Jobs	Unit	High	Low	Average	1952 July-Dec.	1952 Jan.-June
Straw	8	t	113.00	55.00	76.00	75.00	64.00
Fertilizer	5	t	160.00	107.60	136.00	134.00	116.00
Topsoil	12	cy	5.11	0.38	2.18	2.96	2.26
Cultivating	10	sy	0.16	0.03	0.087	0.10	0.08
Seed	8	lb	0.77	0.26	0.39	0.40	0.43
Ice plant	5	ea	0.05	0.03	0.035	......	......

Compared with last six (6) months of 1952: Increases in 6 Items
Decreases in 7 Items

Continued on following page

Subway tracks, New York

continued from preceding page

Item	Unit	Quan-tity	Unit Prices	
			1 C	2
F&D tie pads, 7¾" wide				
5-ply duck-burlap 6¾"	ea	5	0.50	0.55
9¼" long	ea	540	0.50	0.65
11$\frac{15}{16}$" long	ea	110	1.00	0.75
13⅞" long	ea	340	1.00	0.85
14⅛" long	ea	340	1.00	0.85
15¼" long	ea	150	1.00	0.90
18¾" long	ea	340	1.00	1.20
F&D tie pads, 7¾" wide				
fibre-rubber, 6¾" long	ea	10	0.50	0.30
9¼" long	ea	1,000	0.50	0.45
11$\frac{15}{16}$" long	ea	165	1.00	0.65
13⅞" long	ea	330	1.00	0.75
14⅛" long	ea	330	1.00	0.85
15¼" long	ea	150	1.00	0.90
18¾" long	ea	330	1.00	1.00
F&D tie pads, 7¾" wide				
composition, 6¾" long	ea	5	0.50	0.30
9¼" long	ea	450	0.50	0.50
11$\frac{15}{16}$" long	ea	95	0.50	0.45
13⅞" long	ea	330	0.50	0.50
14⅛" long	ea	300	0.50	0.50
15¼" long	ea	130	1.00	0.65
18¾" long	ea	300	1.00	0.70
F&D mal iron tie plates F1	ea	300	4.00	3.30
type F2	ea	190	4.00	3.30
Manganese switch housings				
type A	ea	4	150.00	160.00
type B	ea	2	150.00	160.00
Appurt 150 lb CR & prot				
board, end approaches	ea	27	100.00	101.00
side approaches, no 6	ea	5	150.00	162.00
anchors, type A	ea	21	100.00	95.00
insulators	ea	970	3.00	3.25
insulator caps	ea	970	1.00	0.70
insulator cups	ea	970	0.30	0.25
prot board brackets, galv.	ea	970	3.00	3.00
prot board splice plates	ea	580	2.00	1.95
expansion joints	ea	9	200.00	120.00
CI separators, type B	ea	1,650	2.00	2.00
Mal iron washers, type M-A	ea	1,700	0.50	0.40
type M-B	ea	1,650	0.50	0.50
Ties & timb, untr, 8"x8"	mfbm	0.75	300.00	280.00
Ties 6"x10" tr & drilled				
2'-6" long, type A	ea	1,500	6.00	5.70
2'-6" long, type B	ea	195	6.00	5.70
3'-10½" long, type C	ea	220	8.00	8.20
2'-6" long, type D	ea	21	7.00	6.10
3' long, type E	ea	2,050	7.00	6.30
4'-4½" long, type F	ea	30	10.00	10.40
3' long, type G	ea	380	6.00	5.80
2'-6" long, type H	ea	125	7.00	6.20
2'-6" long, type J	ea	1,100	7.00	6.60
2'-6" long, type L	ea	65	6.00	5.70
3'-10½" long, type V	ea	550	9.00	8.90
2'-6" long, type W	ea	650	7.00	6.60
2'-6" long, type X	ea	240	7.00	6.30
2'-6" long, type Z	ea	50	7.00	6.90
F&D tr undrilled ties, 6"x8"				
8' long	ea	250	10.00	9.80
8'-6" long	ea	50	11.00	11.20
9' long	ea	125	11.00	11.30
9'-6" long	ea	40	12.00	12.10
10' long	ea	30	12.00	14.70
10'-6" long	ea	23	14.00	14.80
11' long	ea	28	14.00	14.90
11'-6" long	ea	15	14.00	15.00
12' long	ea	16	14.00	15.10
12'-6" long	ea	9	16.00	17.00
13' long	ea	12	16.00	17.10
13'-6" long	ea	10	16.00	17.20
14' long	ea	8	16.00	17.30
14'-6" long	ea	10	18.00	19.50
15' long	ea	10	18.00	19.70
15'-6' long	ea	7	18.00	19.90
16' long	ea	3	18.00	20.00
21'-6" long	ea	20	30.00	29.00
22'-6" long	ea	11	30.00	28.00
F&D tr undrilled ties, 8"x8"				
9' long	ea	17	15.00	6.000
9'-3" long	ea	10	16.00	11.80
F&D yellow pine prot board	lf	7,960	0.70	0.60
F&D special work portion				
61-1	ls	1	4,000	5,300
61-2	ls	1	4,600	6,000
107-15	ls	1	4,200	5,600
108-57	ls	1	3,800	5,100
125-1	ls	1	15,400	20,000
Install special work portion				
61-1	ls	1	4,500	4,200
61-2	ls	1	4,500	4,200
107-15	ls	1	4,500	5,100
108-57	ls	1	4,500	5,100
125-1	ls	1	6,800	7,800
Contact rail				
150 lb, installing	lf	7,800	1.00	1.35
& appurt, removing	lf	650	3.00	2.00
prot board, install	lf	7,960	1.00	1.00
joints, complete	ea	230	65.00	52.00
expansion joints, install	ea	9	100.00	50.00
end approach, install	ea	27	30.00	40.00
side approach, no. 6, install	ea	5	50.00	50.00
150 lb anchor, install	ea	21	50.00	60.00
F&I insulated rail joints				
type A	ea	33	50.00	60.00
type B	ea	4	100.00	100.00
type C	ea	8	100.00	100.00
type E	ea	7	100.00	100.00
Rem insulated rail joints	ea	9	100.00	50.00
500,000 corr met cable	lf	500	5.00	3.50
Oak truncking	lf	35	8.00	10.00
Signal work	ls	1	25,500	27,400

Average unit bids, Far West

continued from preceding page

Water supply

Item Description	No. Jobs	Unit	Unit Prices				
			Jan.-June 1953			Previous averages	
			High	Low	Average	1952 July-Dec	1952 Jan.-June
Galvanized steel pipe in place							
1" Diameter	5	lf	2.75	0.68	1.73	1.18	0.82
1½" Diameter	5	lf	2.50	0.60	1.28	1.32	1.07
2" Diameter	9	lf	2.62	1.03	1.68	1.61	1.51
2½" Diameter	7	lf	3.35	1.63	2.47	2.10	1.73
3" Diameter	14	lf	3.30	1.40	2.43	2.74	2.03
4" Diaaeter	2	lf	3.35	3.19	3.27	2.92	2.92
6" Diameter	3	lf	4.20	3.13	3.78	3.89	......
Welded steel pipe							
4" in place	5	lf	3.82	1.28	2.35	3.98	2.82
6" in place	3	lf	4.81	1.83	3.22	4.19	3.94
8" in place	4	lf	6.06	2.50	4.90	4.93	4.22
10" in place	2	lf	7.42	4.43	5.92	5.52	5.36
Cast iron pipe—class 150							
4" in place	8	lf	4.16	2.50	3.09	3.67	4.02
6" in pace	26	lf	7.67	1.37	4.15	5.57	4.42
8" in place	27	lf	11.17	2.00	5.66	6.64	6.29
10" in place	13	lf	11.75	4.93	7.53	9.48	9.33
12" in place	17	lf	14.67	4.67	8.67	11.29	10.68
6" install only	3	lf	3.45	0.45	1.79	1.20	1.02
8" install only	7	lf	3.36	0.48	1.43	0.98	1.65
Cement asbestos pipe							
4" in place	8	lf	5.19	1.22	2.57	2.07	2.59
6" in place	7	lf	6.11	1.38	3.58	2.98	2.84
8" in place	3	lf	7.97	5.00	4.53	3.88	5.14
10" n place	2	lf	11.32	5.68	8.50	4.02	7.13
6" install only	2	lf	1.65	1.33	1.49	1.31	......
8" install only	1	lf	......	......	1.30	1.35	......
Valves—hydrants							
4" G V. in place	9	ea	148.00	50.00	76.00	74.00	68.00
6" G. V. in place	20	ea	221.00	82.00	118.00	126.00	105.00
8" G. V. in place	15	ea	312.00	98.00	170.00	194.00	140.00
10" G. V. in place	6	ea	260.00	106.00	206.00	244.00	195.00
12" G. V. in place	6	ea	472.00	150.00	310.00	285.00	220.00
12" G. V. furnish only	1	ea	......	......	141.00	155.00	......
6" G. V. install only	1	ea	......	......	47.00	41.00	33.00
8" G. V. install only	6	ea	120.00	21.00	50.00	31.00	......
Fire hydrant in place	17	ea	412.00	128.00	256.00	280.00	286.00
Fire hydrant install only	4	ea	125.00	48.00	74.00	102.00	66.00

Compared with last six (6) months of 1952: Increases in 16 items
Decreases in 18 items

Drainage pipe—vitrified clay—sewer

Item Description	No. Jobs	Unit	High	Low	Average	1952 July-Dec	1952 Jan.-June
Standard strength							
4" in place	41	lf	4.33	1.24	2.48	2.83	2.23
6" in place	74	lf	7.17	1.48	3.01	3.32	2.94
8" in place	43	lf	7.50	1.42	3.53	3.93	3.77
10" in place	18	lf	5.70	2.30	4.24	4.57	5.16
12" in place	24	lf	8.77	2.90	5.28	6.04	5.35
15" in place	19	lf	10.77	4.63	7.18	8.72	8.80
18" in place	12	lf	11.73	5.96	8.63	9.20	10.39
21" in place	7	lf	12.61	9.51	10.28	10.40	15.81
24" in place	8	lf	16.67	8.60	13.47	12.65	16.21
27" in place	2	lf	13.35	12.40	12.87	......	26.00
Manhole							
Sewer 4'-6' deep	133	ea	480.00	70.00	253.40	266.56	228.00
Sewer, drop	17	ea	633.00	225.00	344.59	383.00	321.00
Cast iron frame & cover	29	ea	132.00	30.00	72.00	72.78	......
Catch basins	55	ea	375.00	61.00	218.75	......	167.00
Inlets	19	ea	290.00	58.00	178.31	......	......
Drain tile—open joint							
6" in place	3	lf	1.50	0.95	1.17	......	1.00

Compared with last six (6) months of 1952: Increase in 1 item
Decreases in 11 items

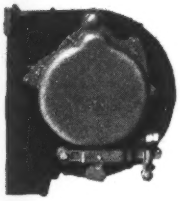
Earthwork

Item Description	No. Jobs	Unit	High	Low	Average	1952 July-Dec	1952 Jan.-June
Roadway excavation	206	cy	3.17	0.24	1.07	1.22	0.92
Unclassified excavation	62	cy	3.92	0.21	0.62	0.71	1.10
Rock excavation	32	cy	11.67	0.93	3.65	7.42	3.50
Tunnel excavation	3	cy	31.00	16.00	21.72	38.45	11.44
Trench excavation	35	cy	5.76	0.31	1.82	2.23	2.60
Ditch & channel excavation	92	cy	4.32	0.20	1.49	1.92	2.41
Structural excavation	213	cy	10.00	0.44	3.57	3.70	3.42
Embankment excavation	18	cy	1.50	0.44	0.65	0.67	0.38
Canal excavation	12	cy	1.70	0.25	0.68	0.45	0.56
Dredging	26	cy	1.50	0.32	0.50	0.47	0.81
Backfill	83	cy	4.00	0.14	1.63	1.95	2.01
Gravel backfill	5	cy	4.90	2.91	4.09	4.23	3.13
Sand backfill	15	cy	4.53	1.16	2.57	4.85	2.64
Backfill compaction	36	cy	4.87	0.79	2.61	3.55	3.19
Embankment compaction	29	cy	0.80	0.08	0.31	0.48	0.62
Borrow pit stripping	20	cy	1.79	0.21	0.56	0.31	0.31
Borrow excavation	62	cy	3.23	0.19	1.09	1.13	0.57
Overhaul	65	stay	0.03	0.002	0.012	0.019	0.019
Overhaul	33	mly	0.56	0.11	0.273	0.24	0.23
Compact original ground	56	sy	0.20	0.04	0.081	0.078	0.11
Subgrade preparation	26	sy	0.36	0.09	0.24	0.18	0.24
Riprap, hand placed	8	cy	18.00	10.00	13.38	15.35	20.00
Riprap, dumped	32	cy	12.83	1.99	6.08	4.67	4.97
Jetty stone	11	t	7.50	2.83	4.74	6.17	5.85
Watering	193	mgal	4.88	0.48	2.14	2.22	1.97
Rolling, flat wheel	15	hr	11.67	3.68	8.00	8.68	7.15
Foot hour tamping	11	fh	1.08	0.50	0.71	0.68	0.60
Rolling, pneumatic	1	hr	......	......	6.67	6.64	6.08
Patrol grading	2	hr	15.12	11.33	13.22	10.47	12.10
Clearing	9	ac	1,333.00	62.00	396.00	436.00	254.00
Grubbing	4	ac	567.00	91.00	251.00	507.00	303.00
Clear and grub	19	ac	1,523.00	55.00	527.00	902.00	368.00

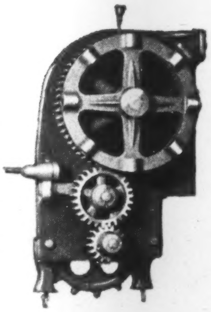
Compared with last six (6) months of 1952: Increases in 10 items
Decreases in 20 items

Rolling Steel Doors

Standard or Automatic Underwriters' Labeled Types!



Mahon Release Device and Governor on the Automatic Closing Mechanism of a Mahon Underwriters' Labeled Rolling Steel Fire Door. In case of fire, Fusible Links release the closing mechanism and the door closes automatically.



Mahon Release Device on the Chain-Gear Operator of a Mahon Mechanically Operated, Underwriters' Labeled, Automatic Rolling Steel Fire Door. Fusing of the Fusible Link, which releases the Automatic Closing Mechanism, simultaneously disengages the Chain-Gear Operator.

Manually, Mechanically, or Power Operated

Below you see three Mahon Automatic Underwriters' Labeled Rolling Steel Doors installed on fire-wall openings of an enclosed shipping dock. These doors normally remain open, but are equipped with mechanical chain-gear operators which permit closing or opening at will. If a fire should occur while they are in the open position, they automatically close and prevent the spread of fire through the openings. This is one use for one type of rolling steel door. Many types are produced by Mahon to meet virtually any door requirement. Mahon quick-opening, quick-closing power operated rolling steel doors offer more desirable features than any other type of door . . . the vertical roll-up action utilizes no usable space either inside or outside the door opening. There are no overhead tracks or other obstructions to interfere with crane operations. No other type of door offers these advantages of space economy and compactness in operation. In addition, rolling steel doors are permanent—their all-metal construction assures a lifetime of trouble-free service and maximum protection. When you select a rolling steel door, check specifications carefully . . . you will find many extra-value features in Mahon doors. See Sweet's Files for complete information including Specifications, or write for Catalog G-54.

THE R. C. MAHON COMPANY

Detroit 34, Michigan • Chicago 4, Illinois • Representatives in all Principal Cities

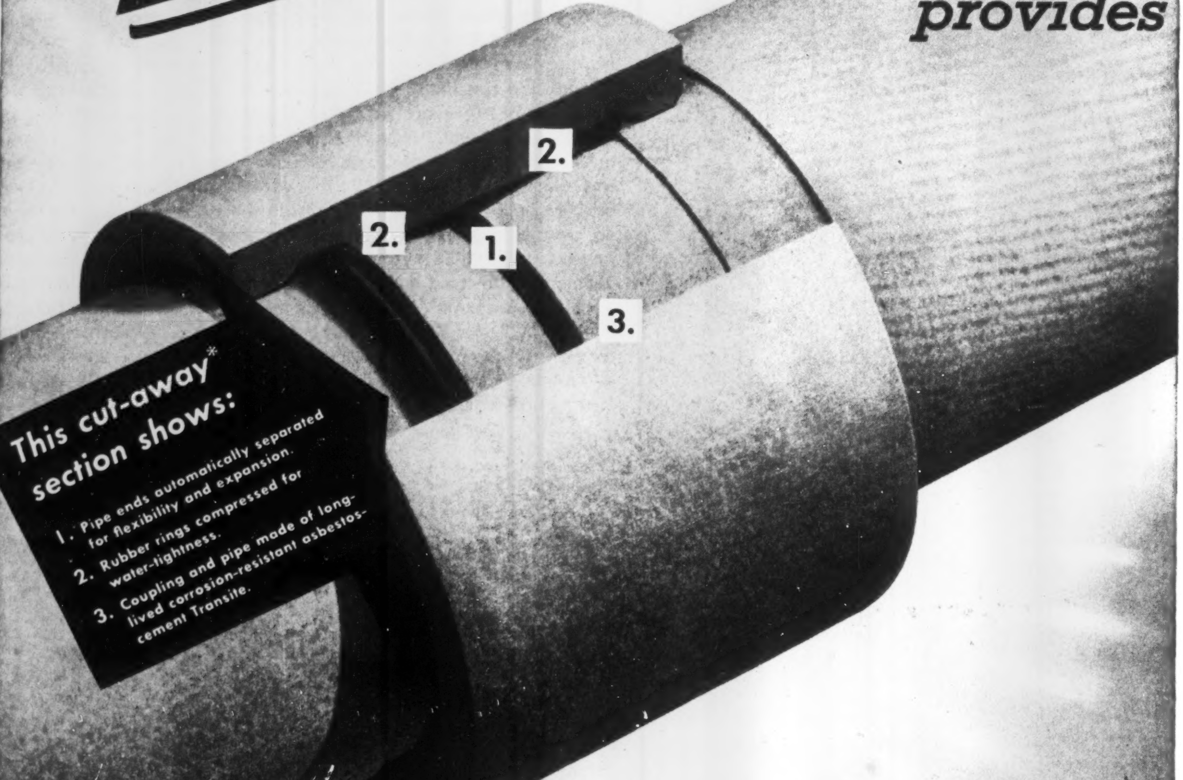
Manufacturers of Rolling Steel Doors, Grilles, and Automatic Closing Underwriters' Labeled Rolling Steel Fire Doors and Shutters; Insulated Metal Walls and Wall Panels; Steel Deck for Roofs, Partitions and Permanent Concrete Floor Forms.

ROLLING STEEL DOORS, SHUTTERS AND GRILLES TO MEET EVERY REQUIREMENT

Three Mahon Underwriters' Labeled, Automatic Rolling Steel Fire Doors installed on openings to an enclosed truck loading dock in a new plant for Towne-Robinson Nut Co., Detroit, Mich. Austin Engineers, Inc., Designers. The Austin Company, Cleveland, Ohio, Gen. Contrs.

MAHON

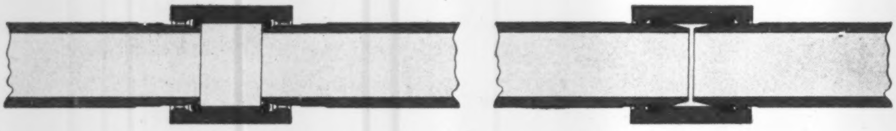
NEW Transite® provides



This cut-away* section shows:

1. Pipe ends automatically separated for flexibility and expansion.
2. Rubber rings compressed for water-tightness.
3. Coupling and pipe made of long-lived corrosion-resistant asbestos-cement Transite.

INSTALLATION OF TRANSITE RING-TITE COUPLING IS SURE, SIMPLE, EASY



A. Rubber rings in groove before assembly

B. Rubber rings compressed after assembly

* **NOTE:** In the large photograph above, a portion of the Ring-Tite Coupling has been removed to show its design. One rubber ring has been cut to illustrate how it is compressed between pipe and coupling;

Johns-Manville

RING-TITE® Coupling

greater economy in pipeline installation
. . . maximum performance in service

- **Simplifies Transite Pressure Pipe assembly**
- **Reduces installation time**
- **Helps assure tight, flexible joints**

Because of its unique design, the new Johns-Manville Ring-Tite Coupling provides many money-saving advantages. For example, no complicated equipment is required for line assembly. With tight, flexible Ring-Tite joints easily obtained, the contractor can get in and get out quickly with a substantial saving of time and money.

Ring-Tite Coupling installations can be made under adverse weather, temperature, or terrain conditions. Loose sand, slippery clay, mud and ice do not interrupt pipe assembly nor affect the performance of the completed assembly. Transite Pressure Pipe and Ring-Tite Couplings can be assembled in wet trenches.

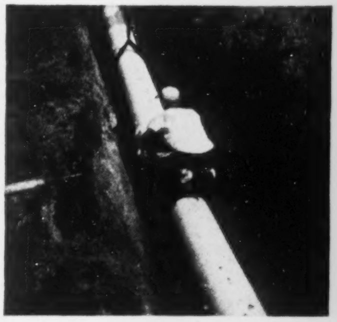
Rings automatically positioned and locked in place

Pipes need only rough aligning. The coupling does the rest automatically . . . centers, aligns and adjusts for expansion. Rings are automatically pre-positioned by simply "popping" them into prepared grooves . . . and when the pipe is being pulled, the sliding motion of the rings squeegees all loose foreign material from the end of the pipe.

Each Ring-Tite Coupling is automatically stopped in exactly the correct sealing position to assure maximum water tightness and joint flexibility . . . to permit conformance to curves . . . to withstand shock and vibration . . . to relieve line stresses.

As a long-term investment, Transite Pressure Pipe effects outstanding performance and economies in your water supply and distribution expansion programs. Now the Ring-Tite Coupling brings you equally substantial *installation* economies—*immediate* savings!

For further information, write Johns-Manville, Box 60, New York 16, N. Y.



Here on this 12" New England installation of the Ring-Tite Coupling, the contractor's bid was based on installing 400 feet per working day for the job conditions prevailing. Actual laying time averaged over 700 feet per day!

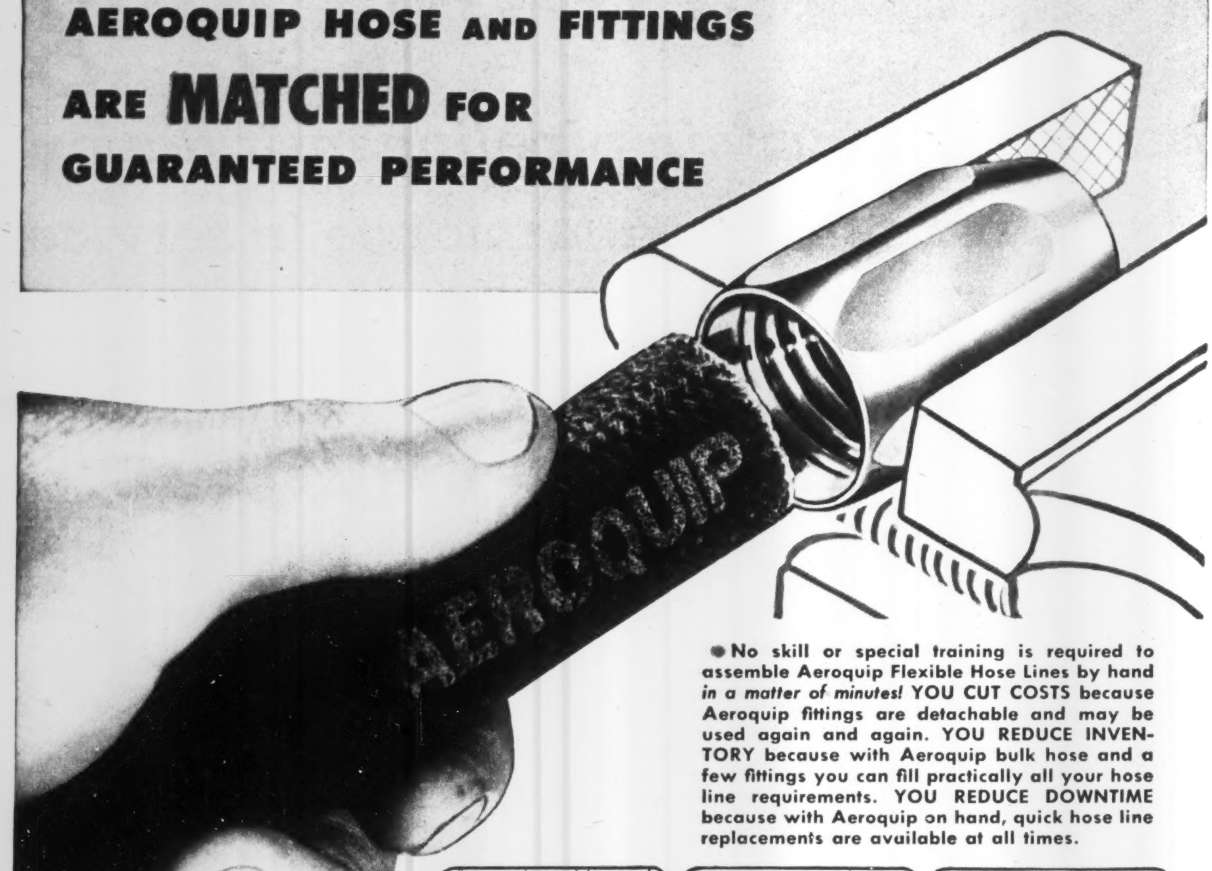
Actual experience on this New Jersey installation by a prominent water works utility established entirely new concepts of installation savings effected by the Ring-Tite Coupling. On the job shown, 600 feet of pipe were laid in 5 hours.

TRANSITE PRESSURE PIPE

JOHNS-MANVILLE
JM
PRODUCTS

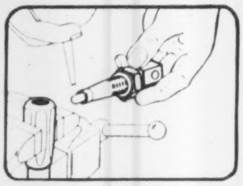
Make Your Own Hose Lines

AEROQUIP HOSE AND FITTINGS ARE MATCHED FOR GUARANTEED PERFORMANCE

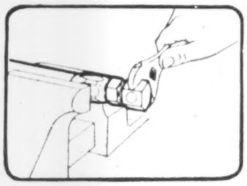


● No skill or special training is required to assemble Aeroquip Flexible Hose Lines by hand *in a matter of minutes!* YOU CUT COSTS because Aeroquip fittings are detachable and may be used again and again. YOU REDUCE INVENTORY because with Aeroquip bulk hose and a few fittings you can fill practically all your hose line requirements. YOU REDUCE DOWNTIME because with Aeroquip on hand, quick hose line replacements are available at all times.

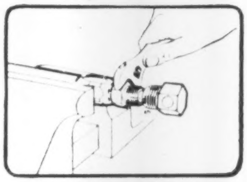
Cut hose to length with hacksaw; screw into socket.



Oil nipple and inside of hose liberally.



Screw nipple into socket and hose.



Install fitting on other end; hose line is ready for use.

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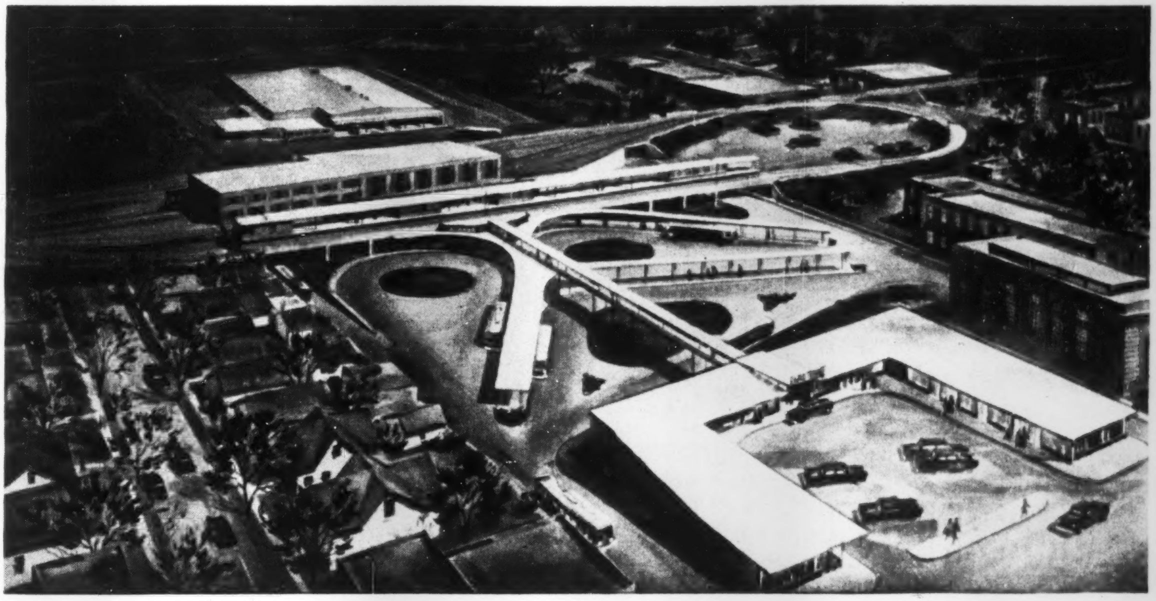


WINDERMERE TERMINAL of Cleveland Rapid Transit project. U-shaped structure in foreground is a group of stores as they may look. Like most of the transit contracts, this one was bid lower than estimates.

Cleveland's rapid transit is a bargain

By construction contracts running below estimates
By big savings being made in right-of-way costs

Ohio's toll highway may be hard put to keep its construction costs within the engineer's estimate, but the Buckeye State's largest city, Cleveland, is getting a bargain in its new 13.3-mile east-west rapid transit project. All construction contracts are running slightly below the 1951 estimates, and a tremendous saving on right-of-way costs was made by using several miles of existing railroad facilities.

The $29.5-million project comparatively is a bargain, according to Morse W. Rew, superintendent of engineering for the Cleveland Transit System. It will serve highly populated areas of the city and is being built for a "fraction of the money being spent in other cities for similar facilities," he said. Ground for the project was broken on Feb. 4, 1952.

With the recent awarding of the last of the major construction contracts indications are that the entire project will be finished within the estimated cost. To date, 41 contracts have been awarded for a total of $19.3 million compared with an estimated cost of $20.9 million.

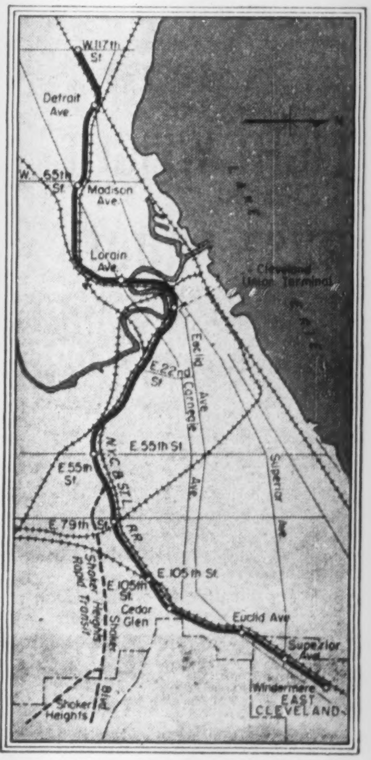
• Good contracts obtained—Rew attributes this close agreement between the engineers' estimates and the contract bid prices to three factors:

- original estimates were sufficiently high to include rising costs of materials and labor,
- economical designs,
- and good contracts obtained with the bidding companies.

For example, Rew points out that the last major construction contract awarded—for construction of the Windermere Terminal in East Cleveland, repair shops, loops for buses, paving and draining—totaled $1.9 million. The estimated cost was $2.2 million.

"On the contract awarded just before that," said Rew, "which was for a section on the West Side, we had figured on $3.6 million. It went for $2.8 million."

• Contract well timed—The chief reason for this favorable price was that it was a big contract coming up in the fall. "This means," says Rew, "that the contractors—The Shirmer-Peterson Co., Cleveland—who have a big organ-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E.55th St
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Superior Ave
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THE ROUTE OF THE SYSTEM passes through highly populated areas, and is a direct connection between the Western and Eastern Cleveland sections.

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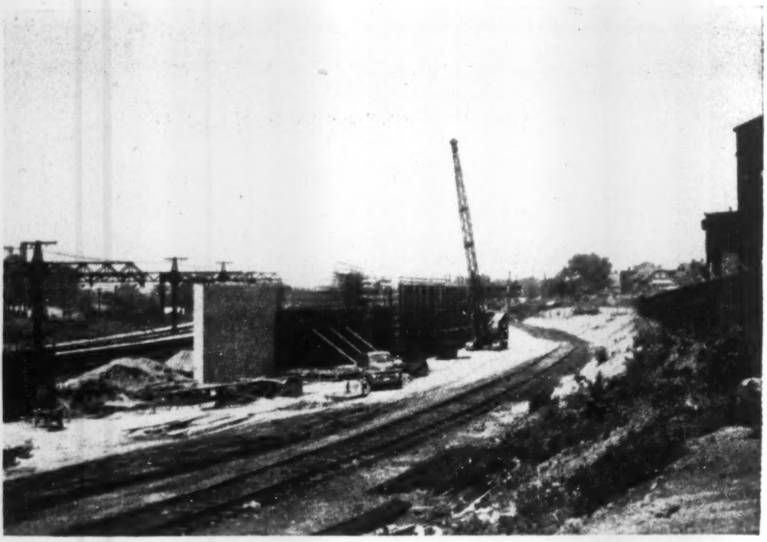

WORK PROGRESSES on the Mayfield-Cornell overpass—typical of the four reinforced concrete structures that will span the right-of-way.

ization, can keep busy most of the winter. Such a job is worth a good deal to them."

• **RFC financed**—Construction of the new rapid transit project, and modernization of existing CTS facilities are being done under a \$29.5-million Reconstruction Finance Corporation loan. Of this amount, \$26.6 million is for rapid transit purposes only. This includes \$1.2 million for right-of-way, but not the \$2.7 million paid the Nickel Plate Railroad for the same purpose.

The project includes 12 stations, serviced by CTS feeder lines. It will run from Euclid and Doan avenues in East Cleveland to West 117th St. and Madison Ave. through the Cleveland Union Terminal. There already is talk of extending it further west later on.

Twenty-two contracts are yet to be awarded. Largest of these is for passageways under Cleveland's Public Square, in the center of the downtown area, estimated at \$650,000.

The Cleveland Transit System also is cashing in on the foresight of the late Van Sweringen brothers, who years ago bought extensive land east of Cleveland and then built a rapid transit line to service its future residents. The city of Shaker Heights at present operates and owns that line, which runs to Cleveland Union Terminal. Fifty L-shaped catenary arches, of the 96 erected by the Van Sweringens for future overhead trolley wires, will be used by CTS.

Donald C. Hyde, general manager of the CTS has estimated that the cost of purchasing all right-of-way, together with the cost of rebuilding facilities that already exist, would come to about \$50 million.

• **Track-laying started**—All rail for the east side section of the rapid system has been delivered and track-laying has begun on the 9.4-mi run that is expected to be in operation in the fall of next year. Continuous welded rail is being used to give a smoother, quieter ride with cheaper maintenance. The target date for opening the west side rapid transit line is spring, 1955.

With the project spread over such a distance, a number of small engineering problems have arisen, Rew said. Among these has been the job of cutting through the floor of the Cleveland Union Terminal to put in moving stairways to the rapid system platform below.

"We have had many cases where we try to get retaining walls in without buying the adjacent property. In other instances we have built crib retaining walls on adjoining property to avoid purchasing additional right-of-way. We also have had the problem of building four overpasses permitting Nickel Plate trains to pass under our right-of-way to industrial plants," Rew explained.

In one area, to make room for an overpass, CTS had to relocate four sets of tracks for a distance of more than a mile. With The Nickel Plate cooperating by closing one of its tracks at a time, the four were moved with little or no interruption of train

This construction is so important to national defense that we are keeping both the project and its location secret.

. . . But it's no secret that Moretrench keeps water under control; and on this job, where construction must go down deep beside a river, a Moretrench Wellpoint System is keeping 33 feet of water out of the excavation, enabling work to progress rapidly "in the dry."

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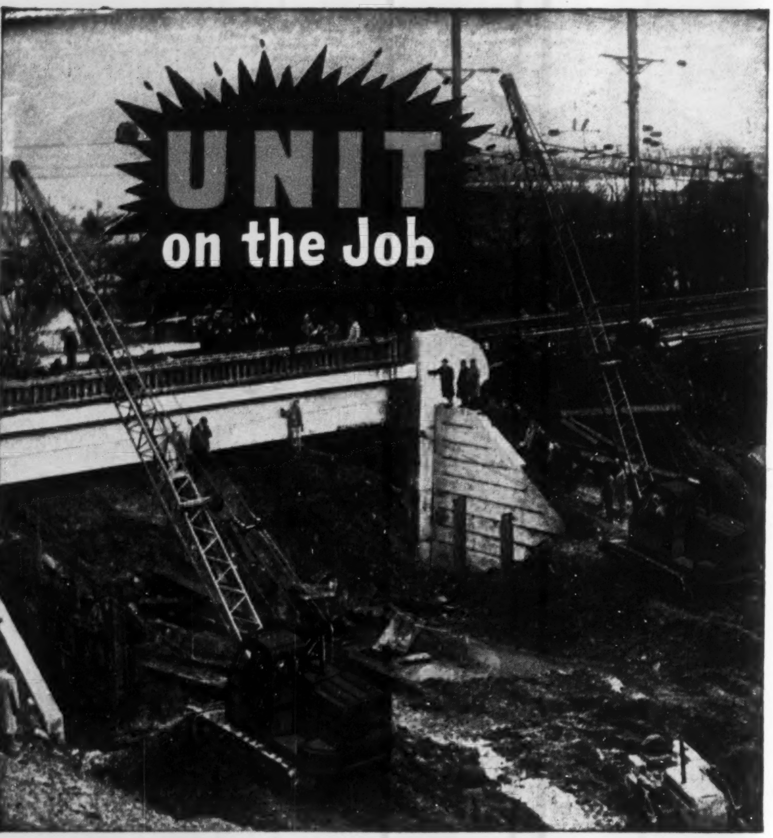

TEAMWORK and Accurate Control

Working as a team, these two UNIT 1020 Cranes moved a 500 TON railroad bridge from its temporary mounting to the new structure in a period of thirteen (13) minutes. This type of job calls for smooth and accurate control of boom and hoist line operation. UNIT'S extra long crawlers, multiple-hinged shoes, wide axles, and hook rollers provide perfect balance and stability. This, together with the FULL VISION CAB for complete visibility, makes UNIT the machine that is dependable and safe to handle efficiently any type of heavy-duty work.

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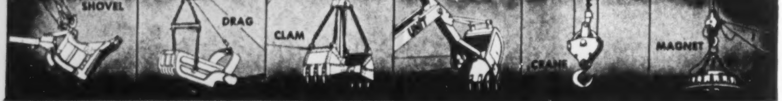

All Models Convertible to ALL Attachments!

movements. The overpass, about 1,800 ft long, has grades of 3.42% and 2.85%.

The rapid system is expected to solve one of Cleveland's major transportation headaches. Offering quick transportation for the east and west side residents, it will connect with the proposed $35-million downtown subway loop, which comes up for approval before the voters of the county this November.

Oakland closes schools said to be 'quake hazards

The board of education of Oakland, Calif., recently voted to close four elementary schools and parts of 13 others because of earthquake hazards.

The action followed an engineers' and an architects' report which rated 29 of the older schools "poor" or "very poor" earthquake risks.

In the same meeting the board directed Superintendent Selmer H. Berg to draw up specifications for a bond issue to finance reconstruction of the unsafe buildings.

The engineering study recommended that the units be demolished and replaced, rebuilt, or altered at a total cost of $21.3 million; but Berg estimated that a $14-million bond issue probably would cover essential reconstruction.

The school board commissioned the structural engineering firm of Hall, Pregnoff and Matheu and the architectural firm of Reynolds and Chamberlain to make the survey of the city's older schools last year, just after the severe Tehachapi and Bakersfield earthquakes.

Excluded from the study were schools built after 1933, when the state's Field Act established earthquake resistant standards for public school construction. Schools remodeled since that date complied with the act.

The Field Act was passed following the Long Beach earthquake of 1933.

The report also stated that another $34 million should be invested to expand school facilities to meet the needs of children who are expected to be attending school by 1960. A population study in the report showed that school enrollment grew from 44,000 in 1940 to 52,300 in 1953. Predictions for 1960 are for about 62,600 total enrollment.

Some $3 million for the program is slated to come from current school funds, and it has been suggested that the balance be financed through the bond issues.

(*Municipal continued on page 217*)

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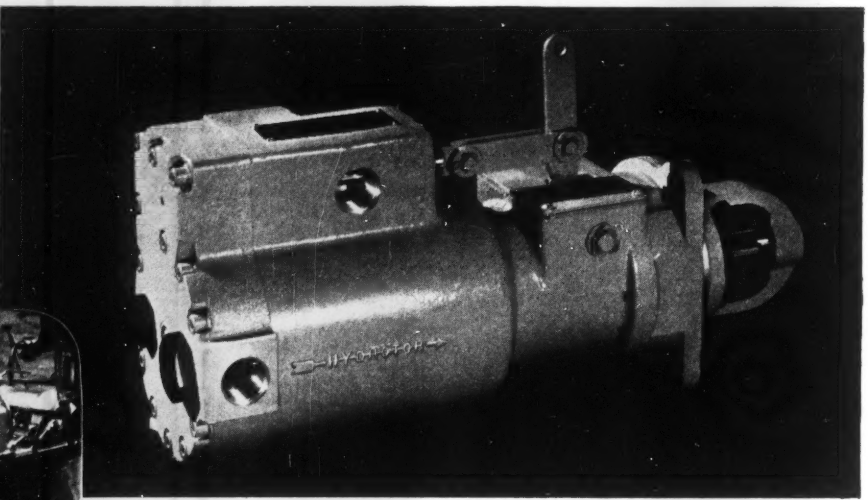

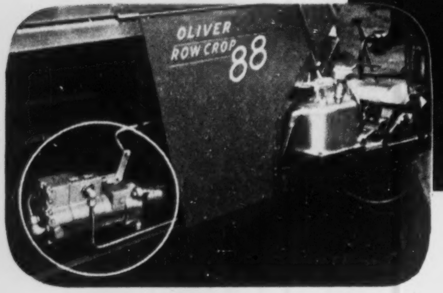

Illustration at left shows installation of HYDROTOR MODEL CM-2 on OLIVER ROWCROP 88 (Hydrotor in circle)

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Photos by Smyser

OLD RAILWAY BRIDGE CARRIES COAST HIGHWAY—The highest of 40 bridges, this one, formerly a railroad structure, has been salvaged, rebuilt and widened to carry the highway over a gulch previously crossed by a tortuous route.

Hawaii highway uses old rail route

Hawaii's Territorial Department of Public Works has completed 27 mi. of the Hamakua Coast Road, a $15-million project that will stretch from Hilo, the island's eastern port, to the plantation village of Honokaa.

When the highway is finished, motorists will be able to make the 40-mile trip safely in an hour. The old road, 45 mi. long, was more scenic, but it took 2½ hours to negotiate its tortuous curves.

Plans for the highway got under way after a tidal wave in 1946 de-

COASTAL HIGHWAY THROUGH SUGAR FIELDS—A winding road knifes through the sugar plantations of Hamakua Coast, Hawaii, shaving an hour of travel time in 40 mi.

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Nine American-made Ellicott Hydraulic Dredges, with four more on order, are doing just that for the young island Republic of Indonesia! Ranging in size from the small 8″ Dragon to the giant 22″ "Musi," they're filling land to support the weight of factories and warehouses . . . filling lowlands to eliminate mosquitoes . . . draining enough new agricultural land to feed millions of Indonesians.

And they're getting the fill from still other Ellicott dredging operations . . . enlarging river channels for heavier traffic . . . deepening harbors right up to pier sides . . . digging irrigation canals to reclaim barren land. It's a heart-warming story of progress . . . made possible by a family of dredges with a time-honored name . . . helping one of the youngest members of the family of nations to grow and prosper!

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If you have a dredging problem, large or small, Ellicott's 67 years of experience in the engineering, design, manufacture, modernization and operation of dredges can help you! For more information, write for Catalog 825 to: Ellicott Machine Corporation, 1603 Bush Street, Baltimore 30, Maryland.

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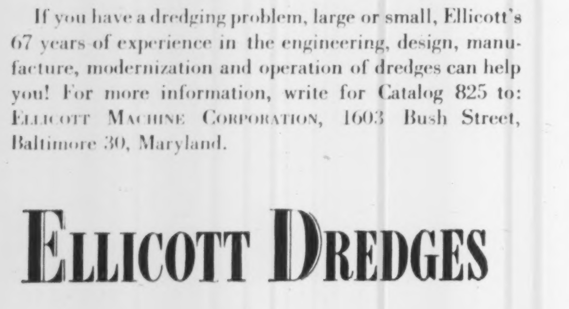
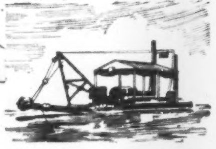
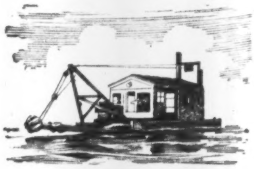


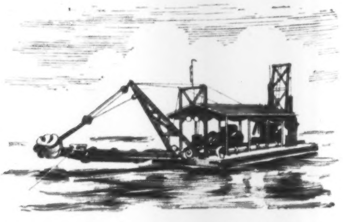
Giant 22″ dredge "Musi" operating in Fisherman's Port, Djakarta. To be used for channel and harbor work at Tanjung-Priok and other major Indonesian ports.



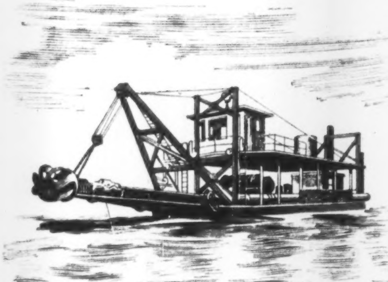
One of 6 Dragon-8's for improving canals. Canals are primarily for irrigation, but also carry small river traffic.



Dragon-10, used for draining lowlands for agricultural use. Four Dragon-10 dredges will be used on this project.



A 12″ Portable Dredge is opening a new harbor area near Djakarta. Spoil is used for fill on which factories and warehouses will be built.



16″ Portable Dredge at Belawan, Sumatra, is deepening harbor to handle larger freighters. To be used later in up-river channel work.

molished a small connecting railway that was used to haul cane from the fields to the mills, and sugar from the mills to the docks in Hilo. The sugar companies decided against rebuilding the railroad, and attempted to use trucks on the existing coast highway. When this turned out to be dangerous and costly, they started pushing for a new road.

The legislature approved an $8.1-million bond issue; and the federal government handed over $10 million to pay for war-damaged and tidal wave-damaged roads. $6.5 million of this was allocated to the Hamakua Road project. These funds, plus money from an extra two-cent-a-gallon tax on gasoline sold on the island, financed the bond issue.

The two-lane, asphalt concrete highway is 24 ft. wide. Generally it follows the old railroad line, but curves back to the old highway route in a few places. Cost is running $65 a road foot, or $343,200 a mile.

The road already has 35 bridges, more than any other stretch of highway in the territory. It will have 40 bridges when it is finished, an average of one per mile.

Some money has been saved by utilizing the steel from the old railroad bridges along the coast, and five of the bridges have been used by strengthening their supports and putting new decks on them. The steel in rebuilt spans was bought for five cents a lb., a considerable saving over the cost of new bridges.

Although the new highway has many deep cuts, landslides are not a problem because the soil in the area is mostly volcanic ash, kept wet by the yearly average rainfall of 190 in., according to Melvin E. Lepine, project engineer.

Rains cause wide damage as Duluth treads water

Don't quote the "quality of mercy" line in Duluth, Minn. Gentle rain hath no mercy when it comes in bunches—you can take the word of Duluth officials on that.

By mid-August Arthur Tews, city engineer for Minnesota's third largest city was beside himself trying to clean up after one storm when another hit his town. Sewers filled, street surfaces were washed out and erosion of dikes and banks of creeks and streams left crevices in residents' front and rear yards.

More than $300,000 damage to sewers, streets and culverts was caused by the eight inches of rainfall which had fallen before the middle of the

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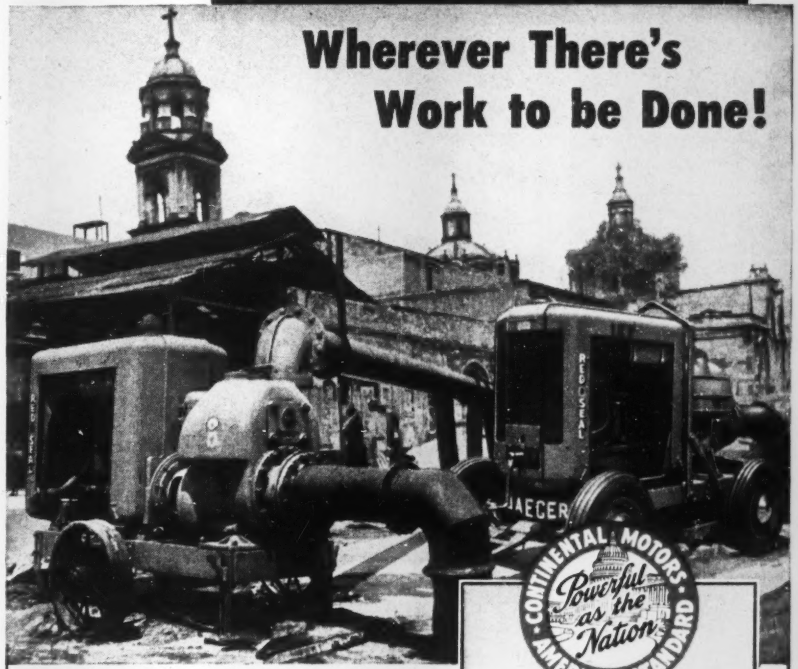

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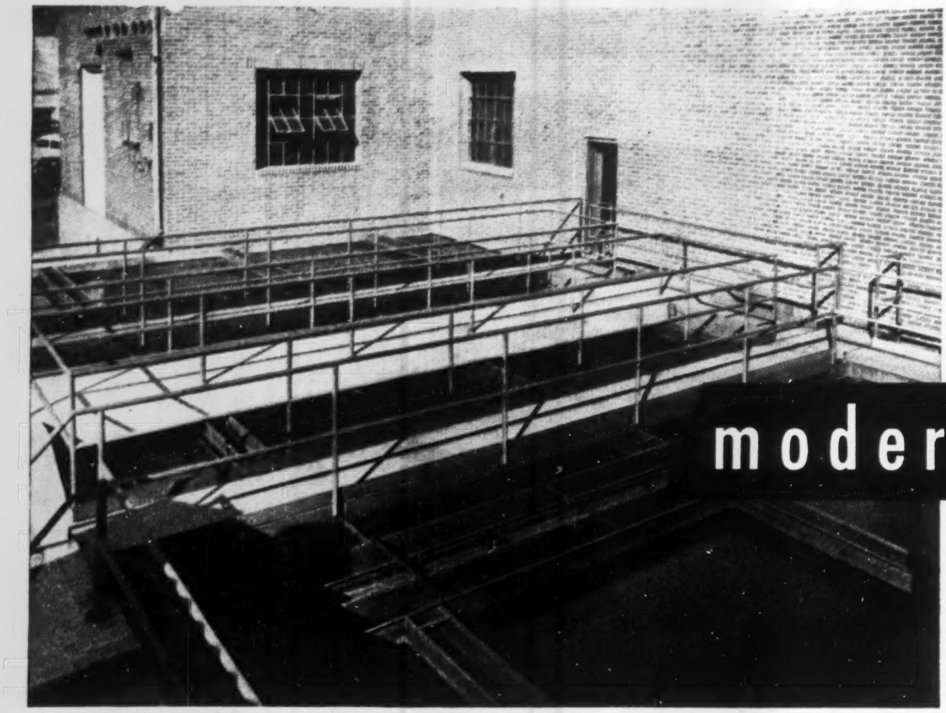

Photo courtesy City of North Kansas City, Missouri

HOW NORTH KANSAS CITY modernized ITS IRON REMOVAL PLANT

To *triple* the 1912 rate of an old-fashioned settling basin and two filters could be a problem—and quite expensive.

Consulting Engineer Charles A. Haskins, solved it very economically. Two compact, modern Permutit Precipitators were built into the *old* settling basin. Operating on the highly efficient sludge-blanket principle, these Permutit Precipitators assure maximum operating economy.

The results of this modernization—detailed in the table below—speak for themselves:

- Total Iron reduced from 5.0 to 0.1 ppm.
- Manganese reduced from 0.2 ppm to essentially zero.
- Turbidity reduced from 50 to only 3 ppm—permits 19 hour per day filter runs with washing only once every 5 days!
- Hardness reduced to level desired.

For full details on the Precipitator write to The Permutit Company, Dpt. ENR-10, 330 West 42 St., New York 36, N. Y., or to Permutit Company of Canada, Ltd., 6975 Jeanne Mance St., Montreal.

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Water Analysis Report Before and After Conditioning

			PPM as	Raw Water from wells before aeration	Precipitator effluent (unfiltered)
CATIONS	Calcium ....(Ca^{++})		$CaCO_3$	145	55
	Magnesium ....(Mg^{++})		$CaCO_3$	103	75
	Sodium ....(Na^{+})		$CaCO_3$	108	105
ANIONS	Bicarbonate (HCO_3^{-})	Alkalinity	$CaCO_3$	190	42
	Carbonate (CO_3^{--})		$CaCO_3$	0	24
	Hydroxide (OH^{-})		$CaCO_3$	0	0
	Chloride ....(Cl^{-})		$CaCO_3$	35	35
	Sulfate ....(SO_4^{--})		$CaCO_3$	146	139
	Total Hardness..................		$CaCO_3$	248	130
	Alkalinity A (Methyl Orange)		$CaCO_3$	190	66
	Alkalinity B (Phenolphthalein)......		$CaCO_3$	0	12
	Free Carbon Dioxide.............		CO_2	16	0
	IRON (total)..................		**Fe**	**5.0**	**0.1**
	Silica..........................		SiO_2	16.8	13.0
	MANGANESE		**Mn**	**0.2**	**0.0**
	TURBIDITY (after shaking)........			**50**	**3**
	Fluorides.......................		F	0.5	0.4
	Color...........................			Turbid	5
	pH..............................			7.3	9.5
	Total Hardness (as $CaCO_3$).......		Result in grains per U. S. Gal.	15	7.6

WATER
CONDITIONING
HEADQUARTERS
FOR OVER
40 YEARS...

PERMUTIT®

month. (The previous record for an entire month was 7.87 inches set in 1889.)

Average August precipitation, according to Tews was 3.31 inches, and this was almost equaled in the Aug. 3-4 storm which poured 2.84 inches on the city. On Aug. 6 it was 2.57, then lesser downpours plagued Tews' department until Aug. 14 when the sky opened up and dumped 1.06 inches more on the engineers' foundering heads.

Tews said that Duluth has petitioned the State Executive Committee for financial aid, but so far no word has been received.

Denver to assess builders who exceed time schedules

Denver, Colo., which in the past has allowed contractors to fix their own time schedules for school construction—subject to acceptance by the school—has decided to require builders to follow a strict construction schedule or suffer penalties for every day's delay in work.

The system is being placed in effect on a $30-million construction program and is based upon experience gained during completion of a $21-million schedule started in 1948.

• **Contractors back plan**—Contractors and administrators have endorsed the new plan, said Graham R. Miller, assistant superintendent of schools.

Miller said that the schools will go to local contracting associations and will obtain a time estimate on how long it will take for the construction of any one project. These timetables will be incorporated in the bids. The contractor making the bid agrees to perform his work within the time limit.

Schools will use day-by-day timetables in checking the progress of construction, Miller said. At the end of every month of a project's operation, the schools will withhold $300 for every day's delay in work.

"If the contractor should make up the lost time in the next month, he'll get the money back," said Miller.

Under the old system, contractors could set an excessive amount of time for the construction and then collect a bonus for each day saved. This cannot happen under the new system, he said.

"Of course," said Miller, "if incidents over which the contractor has no control delay his work, we won't withhold his payments, but he must explain the delays in writing to our satisfaction."

(*Municipal continued on page 222*)

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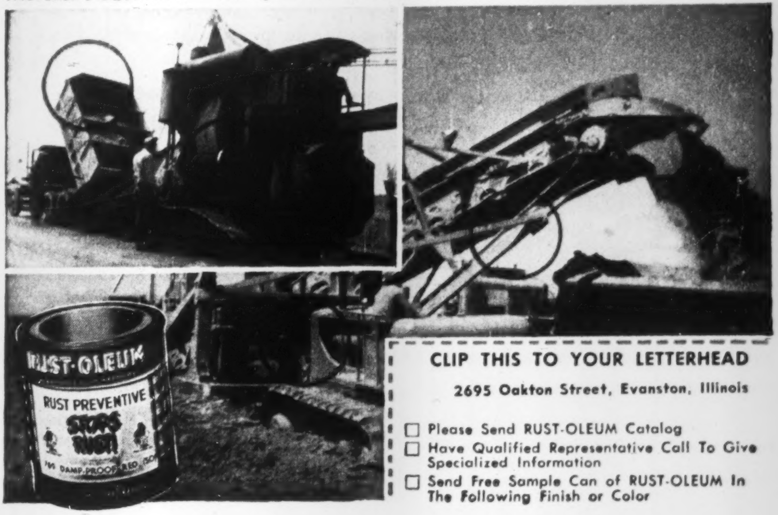

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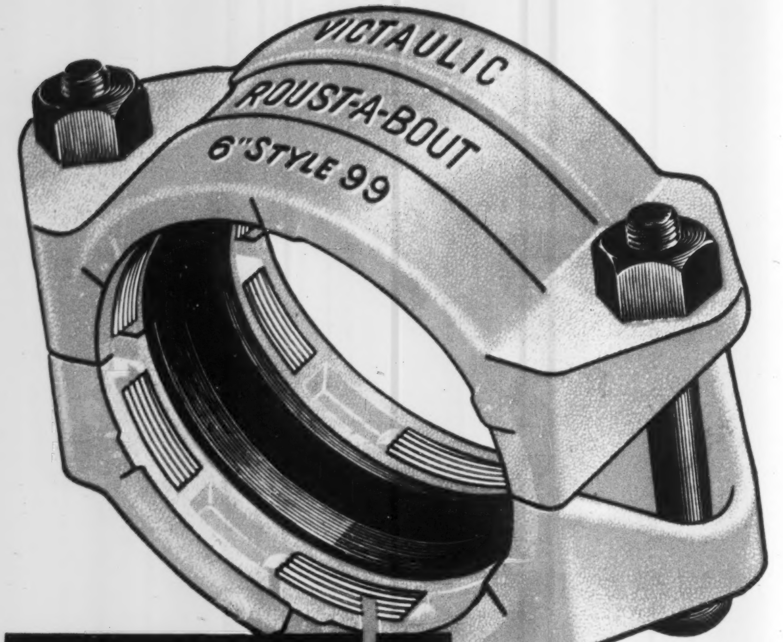

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MUNICIPAL

Wisconsin law grants aid to firms' clean-up drives

The recent enactment in Wisconsin of a bill to give industries special tax concessions for money spent on facilities for the control of water and air pollution may prove a model for similar action in other states, it has been claimed.

The act allows a five-year moratorium on local property taxes, and allows industries to amortize investments in such works over a five-year period instead of 20 years.

The tax concessions will be allowed for pollution control facilities installed as a result of any orders or recommendations of duly authorized state or local agencies. Earnings from by-products developed through use of the abatement equipment would be applied as a financial offset.

Chesapeake clean-up urged

A battle against increasing pollution of the upper Chesapeake Bay area, including the Elk and Susquehanna rivers, has been launched by the Upper Chesapeake Watershed Association.

A clean-up program is urgently needed, according to officials of the association, because of population increases and pressure of industrial expansion. Pollution is a genuine threat to public health in the area, they pointed out.

L.A. adds to water supply

A major connection between the Los Angeles water system and the Colorado River Aqueduct supply lines was completed recently when Colorado River water was turned into the new 85-million-gallon Eagle Rock Reservoir and a six-mile section of 68-in. Eagle Rock-Hollywood conduit (ENR July 17, 1952, p. 63).

After site preparation by the city's Dept. of Water and Power, feeder lines, the reservoir and appurtenant tunnels were completed by the Kemper Construction Co. for $1.4 million.

The reservoir, started in 1950, was formed by excavating canyon slopes and constructing an earthfill dam at the lower end of the canyon. The dam, has a crest height of 962.5 ft.

The entire basin was lined with 361,000 sq ft of asphaltic concrete, and a total of 750,000 cu yds of earth was excavated during construction.

The conduit, first pipe laid 1952, has a capacity of 171 mgd, or enough to satisfy the requirements of a prospective additional million residents.

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A CF&I PRODUCT

Catch fish with wire rope?

Yes, gentlemen, there's more fish caught with wire rope than ever nibbled at a baited hook. Satisfying America's appetite for nutritious seafood is a stupendous job, calling for fleets of fast, powerful trawlers that net their catches in prodigious quantities. To hold and haul in the heavily laden nets, the fishing industry annually uses millions of feet of wire rope.

There's a good chance the fish you eat comes to your table with the help of Wickwire Rope. Because, for over half a century, Wickwire Rope has "grown up" with the nation's fisheries. As in so many other activities where wire rope is used, the men who man the fishing fleets have a high regard for its strength and durability under the toughest conditions.

A YELLOW TRIANGLE ON THE REEL IDENTIFIES WICKWIRE ROPE

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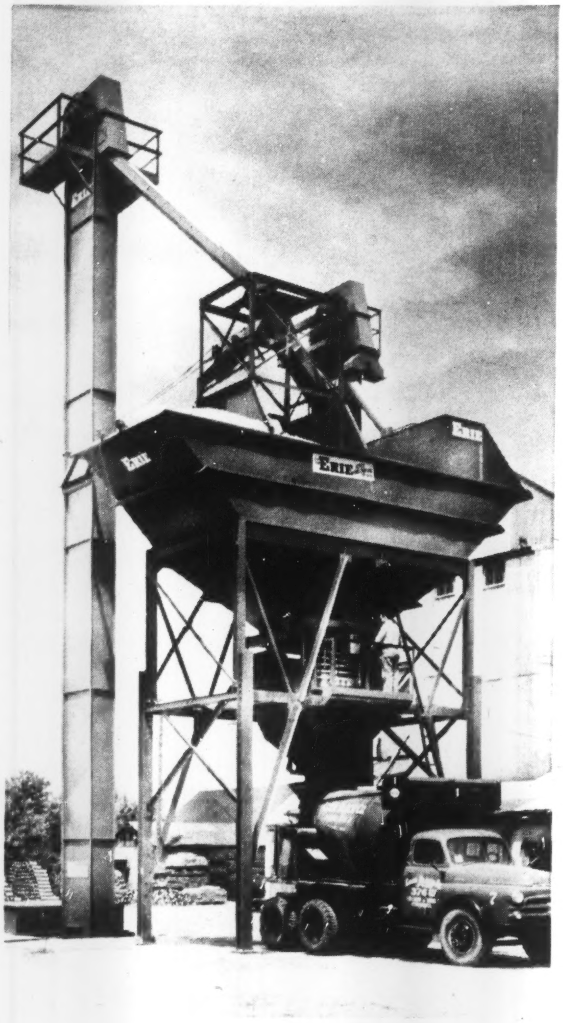
1757

VETERAN COOK BLOCK CO. GETS INTO READY-MIX FIELD; PICKS ERIE PORTABLE TRUCK MIXER PLANT

CROSWELL, MICH., BUILDING SUPPLY FIRM SAYS: "ANY FURTHER ADDITIONS TO OUR PRESENT SET-UP WILL BE ERIE EQUIPMENT."

RALPH W. COOK, MANAGER



One man is all that's needed to run this plant for Cook Block Co. Equipment includes: Erie Portable Combination Bin model GTES-79 cu. yds. with EWEH 3-cu. yd. combination AggreMeter; 75 TPH aggregate elevator and 50 TPH cement elevator. Sold by Contractors Machinery Co., Detroit, Mich.

Recently the Cook Block Co., in the building supplies business for more than 40 years, wanted to expand their activities. The growing demand for concrete suggested that a ready-mix plant would make a worthwhile addition to their existing facilities.

When deciding on batching equipment, they chose Erie because they considered it properly engineered and well designed to do their specific job. Performance of this plant has proven their judgment right.

If you are contemplating entering the ready-mix concrete field or are considering replacing your present plant, learn the facts about Erie before you make any decision.

For further information, write Dept. R103-1 Cable Address: EXIMPORT

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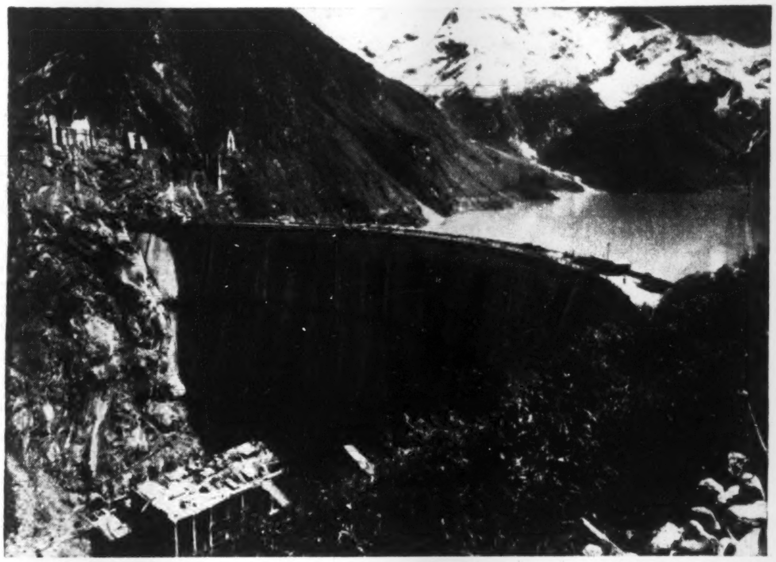


LIMBERG DAM, on the Kaprun River, will help back up a 70,000-acre-ft capacity reservoir. In the snowbound Alpine winter very little water flows into the reservoirs, but in the summer when the snow melts, water fills the reservoirs and power is used to store more water for winter generating.

Austria to have highest and largest pumped-storage hydropower projects

In Austria little rivers and big glaciers plus record pumped storage and high heads furnish peak-load power in the winter months. On the Kaprun River, near the German and Italian borders, one of the world's largest pumped-storage hydroelectric projects is scheduled for completion in 1955. And in Carinthia, near the Yugoslav border, the Reisseck pumped storage system will have the highest head (5,800 ft) of any hydro installation in the world when it is completed in 1958.

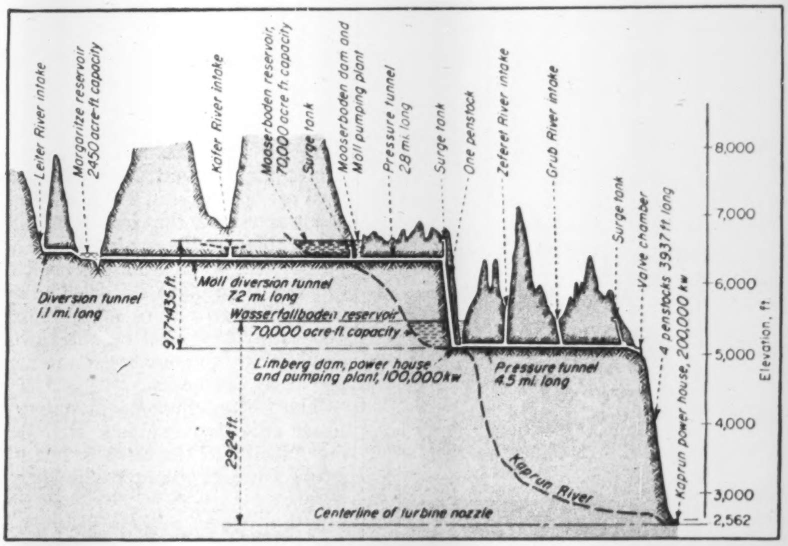
• Pumped-storage economy—Because of climatic conditions and the uneven demand for power in Austria, these pumped storage systems represent the most practicable solution for power generating in that country. Most of Austria's river flow comes from high mountains where the extreme cold in winter piles up snow and ice so much that winter runoff is only about 10 to 15% of summer flow. Further to compound the problems of small winter flow, the demand for power is about three times as great in the six winter months as in the summer. Much of the winter power in Austria must be thermally generated at considerable expense so that the winter electricity rates are much lighter.

Because of these factors Austria finds that it pays to pump water from an intermediate level above a main powerhouse to a high-level storage reservoir. The water is pumped in the summer at the cheaper summer rates and then used at the higher head to generate winter power which can be sold at higher rates.

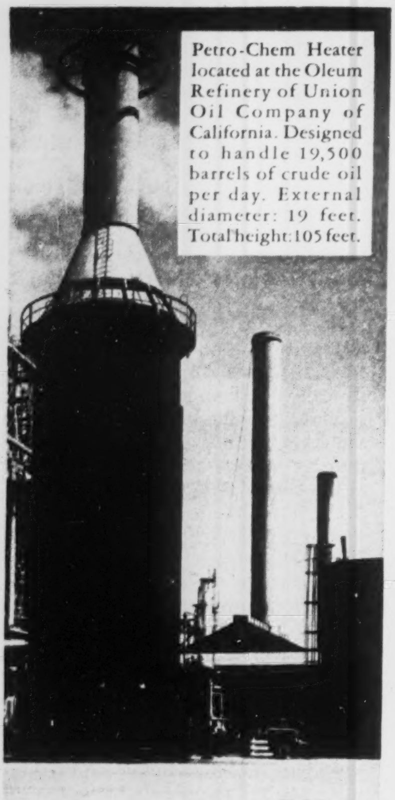
Because of the winter-summer rate differential, some pumped storage systems in Austria operate economically in using one kwh of summer power to produce only 0.6 kwh of winter power. However, the projected Reisseck pumped-storage system will do better than that. By pumping against a 4,172-ft head in summer and generating with a 5,800-ft head in winter, the Reisseck system will use one kwh of summer power to produce one kwh of winter power.

The Limberg plant in the Kaprun project will pump in summer against the same head it will use in the winter. Although it can not have the efficiency of the proposed Reisseck system, Kaprun will make money by supplying 600 million kwh in the high-rate winter months and only 200-million kwh in the summer. This amount of power totals more than 10% of Austria's yearly use.

• Glockner-Kaprun—When completed in 1955, the Glockner-Kaprun project will include 15.6 miles of tunnels, three reservoirs with a combined stor-


Leiter River intake
Margaritze reservoir 2450 acre-ft capacity
Kafer River intake
Mooserboden reservoir, 70,000 acre ft. capacity
Surge tank
Mooserboden dam and Moll pumping plant
Pressure tunnel 28 mi. long
Surge tank
One penstock
Zeferet River intake
Grub River intake
Surge tank
Valve chamber
4 penstocks 3937 ft long
Kaprun power house, 200,000 kw
Diversion tunnel 1.1 mi. long
Moll diversion tunnel 7.2 mi. long
Wasserfallboden reservoir
70,000 acre-ft capacity
977-1435 ft.
Limberg dam, power house and pumping plant, 100,000kw
Pressure tunnel 4.5 mi. long
2924 ft.
Kaprun River
Centerline of turbine nozzle
8,000
7,000
6,000
5,000
4,000
3,000
2,562
Elevation, ft

BIGGEST PUMPED-STORAGE POWER PROJECT in the world, the 300,000-kw Glockner-Kaprun development in Austria, will pump water in summer from lower (Wasserfallboden) reservoir to upper reservoir (Mooserboden) to generate peak-load power in the winter at Limberg and Kaprun.



Petro-Chem Heater located at the Oleum Refinery of Union Oil Company of California. Designed to handle 19,500 barrels of crude oil per day. External diameter: 19 feet. Total height: 105 feet.

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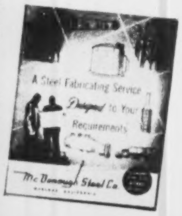
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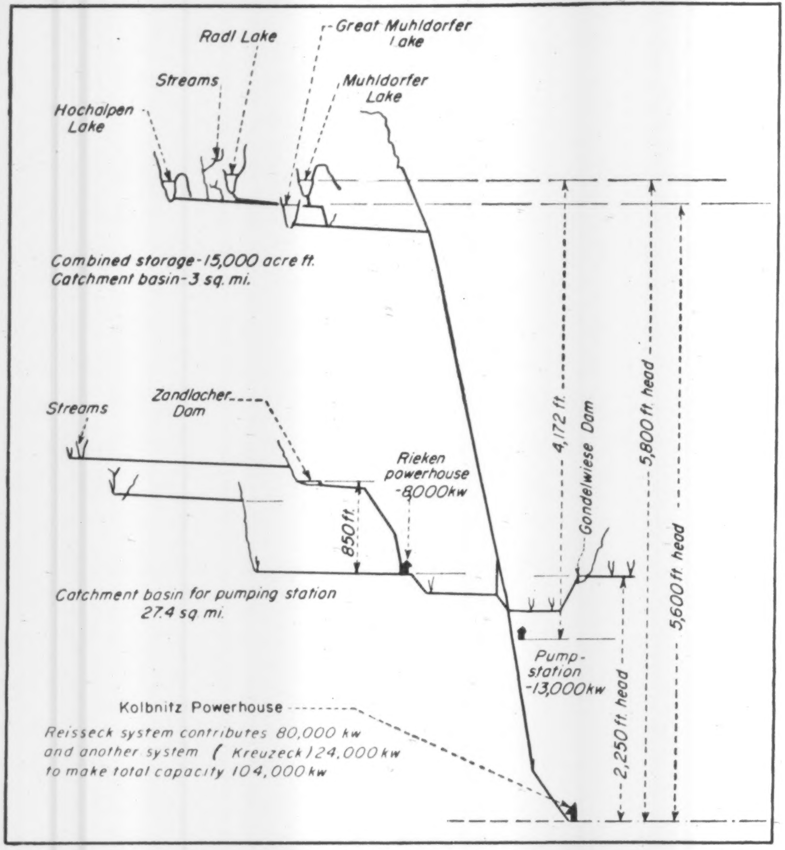

Radl Lake
Great Muhldorfer Lake
Streams
Muhldorfer Lake
Hochalpen Lake
Combined storage-15,000 acre ft.
Catchment basin-3 sq. mi.
Zandlacher Dam
Streams
Rieken powerhouse -8000kw
850 ft.
4,172 ft.
Gondelwiese Dam
5,800 ft. head
5,600 ft. head
Catchment basin for pumping station 27.4 sq mi.
Pump-station -13,000kw
2,250 ft. head
Kolbnitz Powerhouse
Reisseck system contributes 80,000 kw and another system (Kreuzeck) 24,000 kw to make total capacity 104,000 kw

WORLD'S HIGHEST HEAD, the projected Reisseck pumped-storage system, in the Austrian Tyrol, will pump water from lower level (during power-cheap summer months) 4,172 ft to upper storage level to provide 5,800-ft head for winter generating.

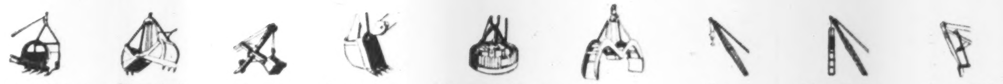
age capacity of 142,000 acre-ft, two generating stations and two pumping plants. At the head of this project the Margaritze Reservoir, finished in 1952, empties into a 7.2-mile long diversion tunnel which takes the water to the Moll pumping plant. This plant, scheduled for operation in 1955, will pump the water into the recently finished Mooserboden Reservoir. The Moll pumps will work against a head that can vary from 66 to 297 ft. The operation of these pumps makes possible 100 extra ft of head on the turbines downstream and increases water storage at Mooserboden.

The Mooserboden Reservoir is formed by two concrete arch dams, one 328 ft and the other 312 ft high. From a pressure-tunnel near the foot of one of these dams the water will run to a penstock made inside a cliff face. This penstock drops the water to a power plant in the toe of the 390-ft high concrete-arch Limberg Dam. When completed late this year the turbines in the Limberg powerhouse will generate 100,000 kw.

The Limberg Dam backs up the Wasserfallboden Reservoir, and the Limberg turbines discharge into the reservoir against a head that will vary from 50 to 320 ft. Head on the turbines themselves will vary from 977 to 1435 ft because of water level variations in Mooserboden and Wasserfallboden.

• World's biggest pumps—At the Limberg Dam power house, two of the largest pumps in the world will pump water back up to the Mooserboden Reservoir. These pumps are laid out for a power output of 77,500 HP each and will be driven by the Limberg turbines using off-peak and surplus power from the Glockner-Kaprun system. The pumps discharge 200,000 gpm each against a variable head of 1,270 to 1,483 ft depending on water level in the storage basins. The first pump at Limberg will go into operation in 1955.

[Grand Coulee Dam in Washington



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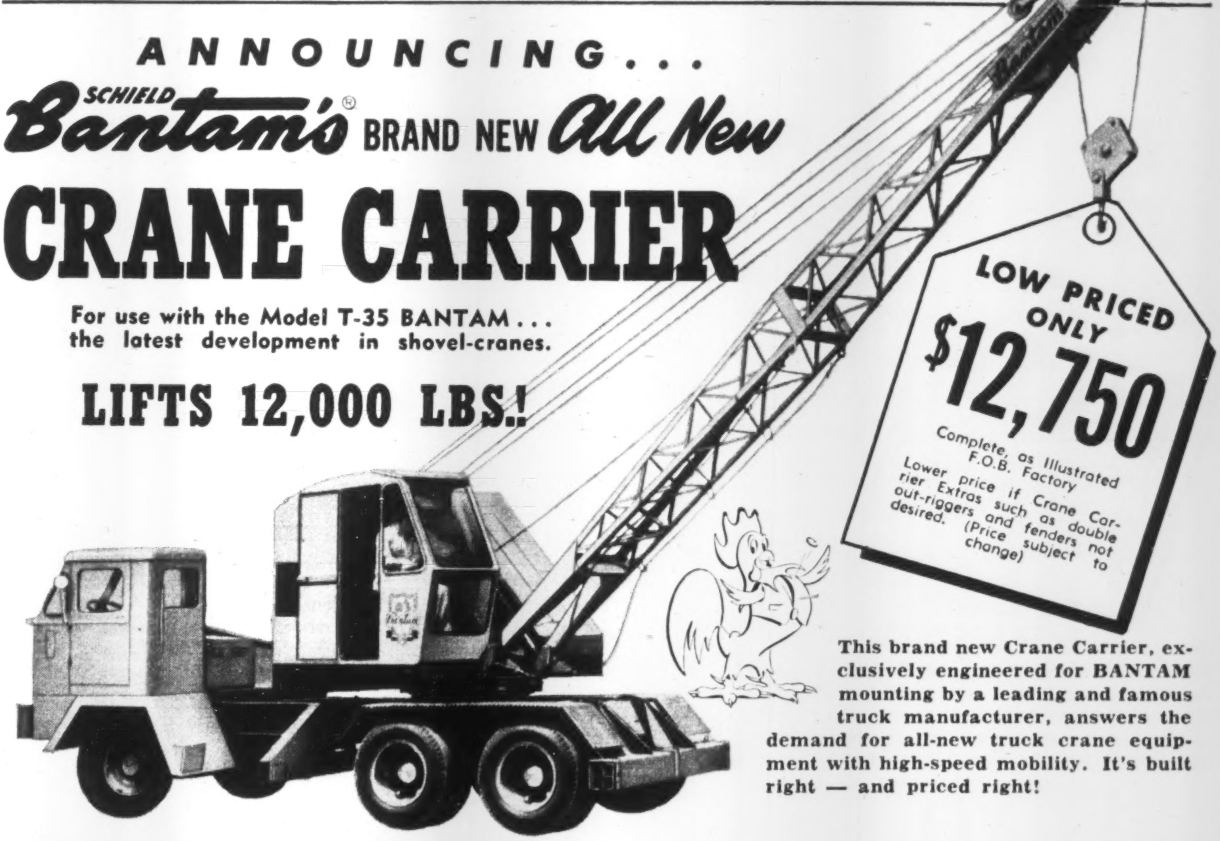

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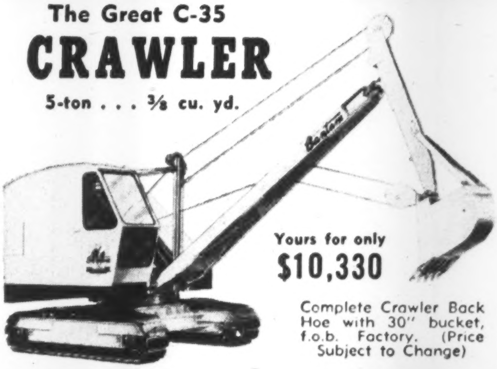

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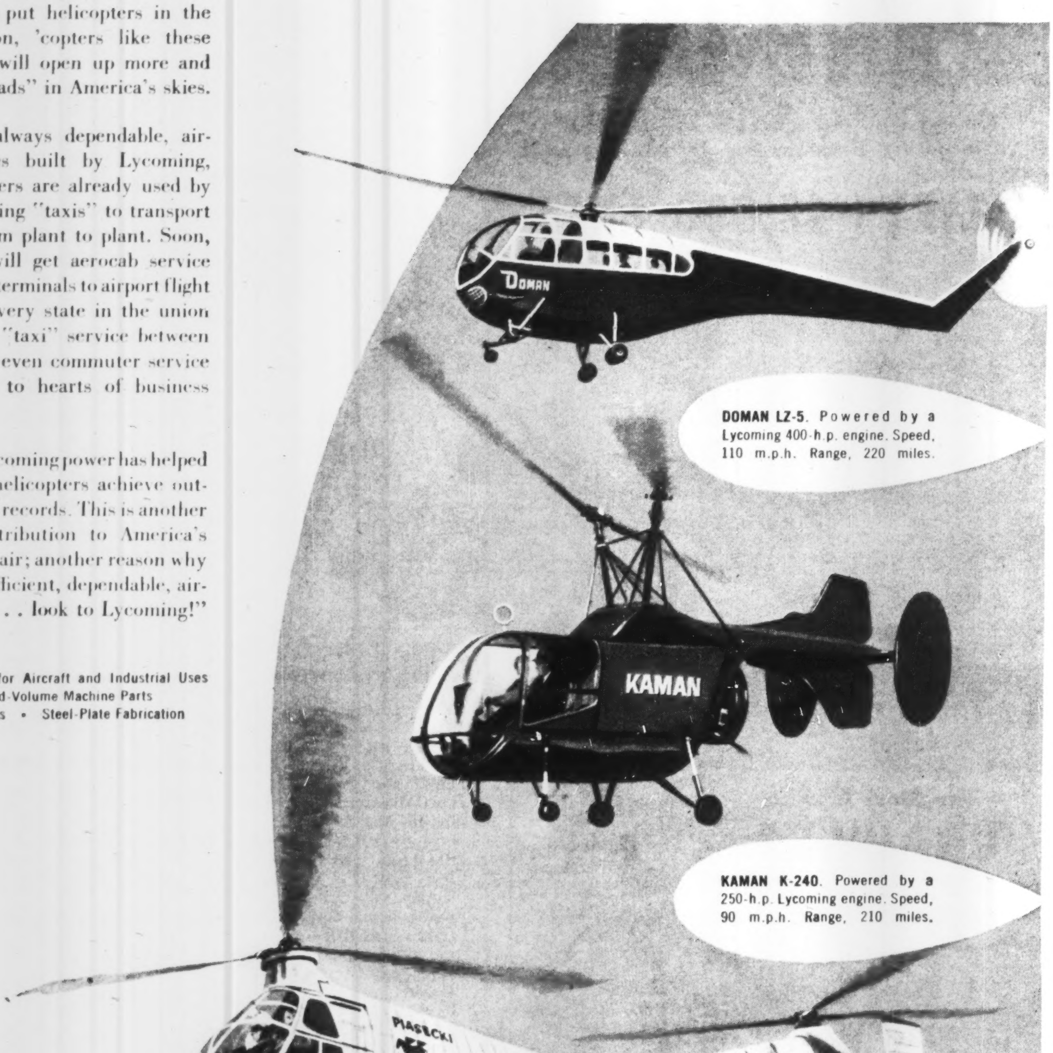

DOMAN LZ-5. Powered by a Lycoming 400-h.p. engine. Speed, 110 m.p.h. Range, 220 miles.

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has the next biggest pumps in the world. They are rated at 65,000 HP each. Six of the twelve pumps called for in the design of Grand Coulee are now installed. The largest turbine pump in the world is being built for the Hiwassee plant of the TVA. As a turbine this unit will develop 80,000 HP and will discharge 1,750,000 gpm against a head of 205 ft and will require 102,000 HP for driving.]

Water from the Wasserfallboden reservoir will drive the four turbines at the Kaprun powerhouse under a maximum head of 2924 ft. From Wasserfallboden a pressure tunnel leads to a surge tank above the Kaprun plant and four penstocks deliver the water to the Kaprun turbines which will have an ultimate capacity of 200,000 kw. The Kaprun power plant is now in partial operation.

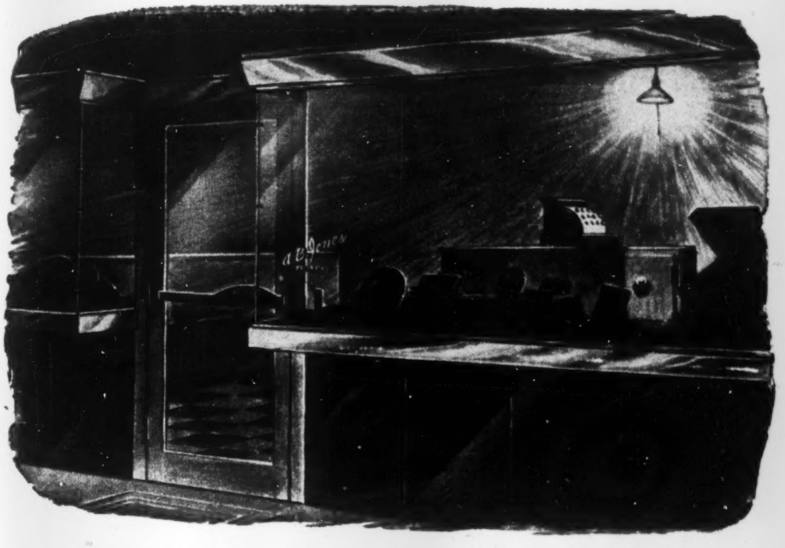
• World's highest head plan—Work on the 5,800-ft head Reisseck pumped storage system is only at the initial stage. Of the four high-level storage reservoirs only one has been dammed up so far. The Reisseck system power plant at Kolbnitz will also draw on water from the nearby Kreuzeck drainage basin system. Upon completion in 1958, the Kolbnitz powerhouse will have an installed capacity of 104,000 kw—80,000 kw from the Reisseck pumped storage system, and 24,000 kw from the Kreuzeck system. (The second highest head in the world, 5,700 ft, is on the Dixence, Switzerland, power plant.)

In the summer, water coming through the Ricken powerhouse and from Gondelwiess Dam will be pumped up 4,172 ft to the high-level storage reservoirs. Power for this operation can come from the Ricken powerhouse and the Kolbnitz powerhouse. Gondelwiess Dam storage provides a head of 2,250 ft at the Kolbnitz power plant.

• Dependent on export—Austria has requested a $19-million loan from the World Bank to complete the Reisseck storage group. The credit will be extended to Austria on the assurance that Italy will buy 100,000,000 kwh of electricity annually from Austria. A new power line is at present under construction to connect the high-voltage net at Lienz with the Italian high-voltage net at Pelos in order to transfer an annual quota of 80,000,000 kwh to Italy. With the assurance of selling 100,000,000 kwh annually Austria will be able to pay back the World Bank loan for the construction of the Reisseck system.

(International continued on page 230)

The light that fails—



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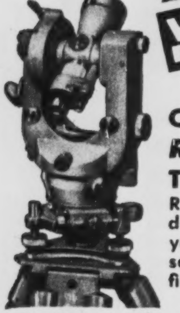

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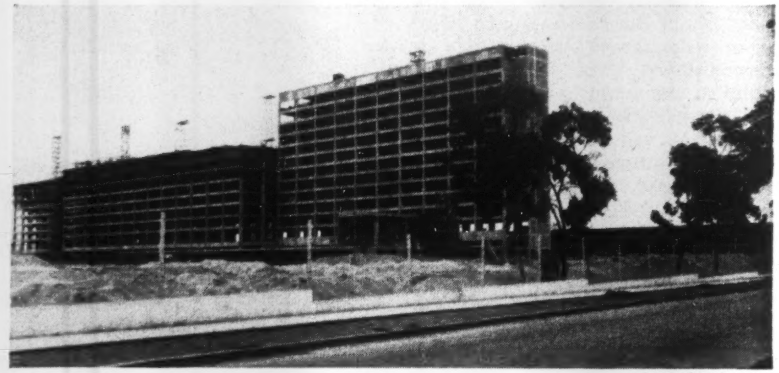

Photo by Ramus

NEW HOSPITAL in Lima, Peru, is an earthquake-resistant reinforced concrete structure which will provide medical facilities for more than 2,000 patients. The building in the rear is residence for nurses and personnel.

New hospital under construction will be Peru's largest and best

Started in April, 1951, the $16-million Social Security Hospital For Employees in Lima is scheduled for occupancy in October, 1955. Construction work on the 13-story, reinforced concrete building will be completed this December.

Large by any standards, the hospital will provide maternity and general medical services for 850 in-patients, 589 maternity outpatients, and will handle 630 general out-patients per six-hour day.

The hospital is divided into three major sections: Two 13-story wings flank a central section of 16 stories and penthouse. The main floor of all three sections is split up into patios and gardens. All patients' rooms in the hospital will be outside rooms facing landscaped grounds.

Each of the three sections of the building has its own passenger and service elevators. There is a total of 15 elevators in the whole building.

The earthquake-resistant structure is designed for a somewhat heavier lateral force factor than is used in the western U. S. for similar reinforced concrete structures. Between each of the hospital's three sections is a specially designed 8-in. expansion joint. All the spandrel beams on the long sides of each section are placed high so that the bottom of the floor slab is at the same level as the bottom of the spandrel.

Edward D. Stone and A. L. Aydelott of New York headed the group of architects who designed the building. Peruvian architects on the design were Richard J. Malachowski, Fernando Correa, and Gerardo Lecca. Three other Americans, Robert Brown, Lloyd Flood, and Lee Everidge, were also architects for the hospital.

Contractors for the project include the Peruvian firms of Consorcio de Ingenieros Contratistas Generales, Flores & Costa, Grana y Montero, and R. Vargas Prada y Cia.

Iraq to carry out record irrigation and flood control program

First steps are being taken in what may be the largest irrigation and drainage plan ever undertaken in the world. The program, in oil-rich Iraq, will involve flood-control of the historical Tigris and Euphrates rivers and the irrigation and drainage of the whole twin-river valley. An area covering some 14,000,000 acres, from Baghdad in the north to Basrah in the south will benefit from the project. As designed, the plan will take 25 years to complete and will cost about $500 million.

In the next six years $300 million of the total cost is scheduled to be spent in construction of escape regulators for flood flows, drainage outfalls, irrigation canals, flood-control dams, canal intake structures, desilting works, and pumping stations. The Iraqi government has pledged 70%

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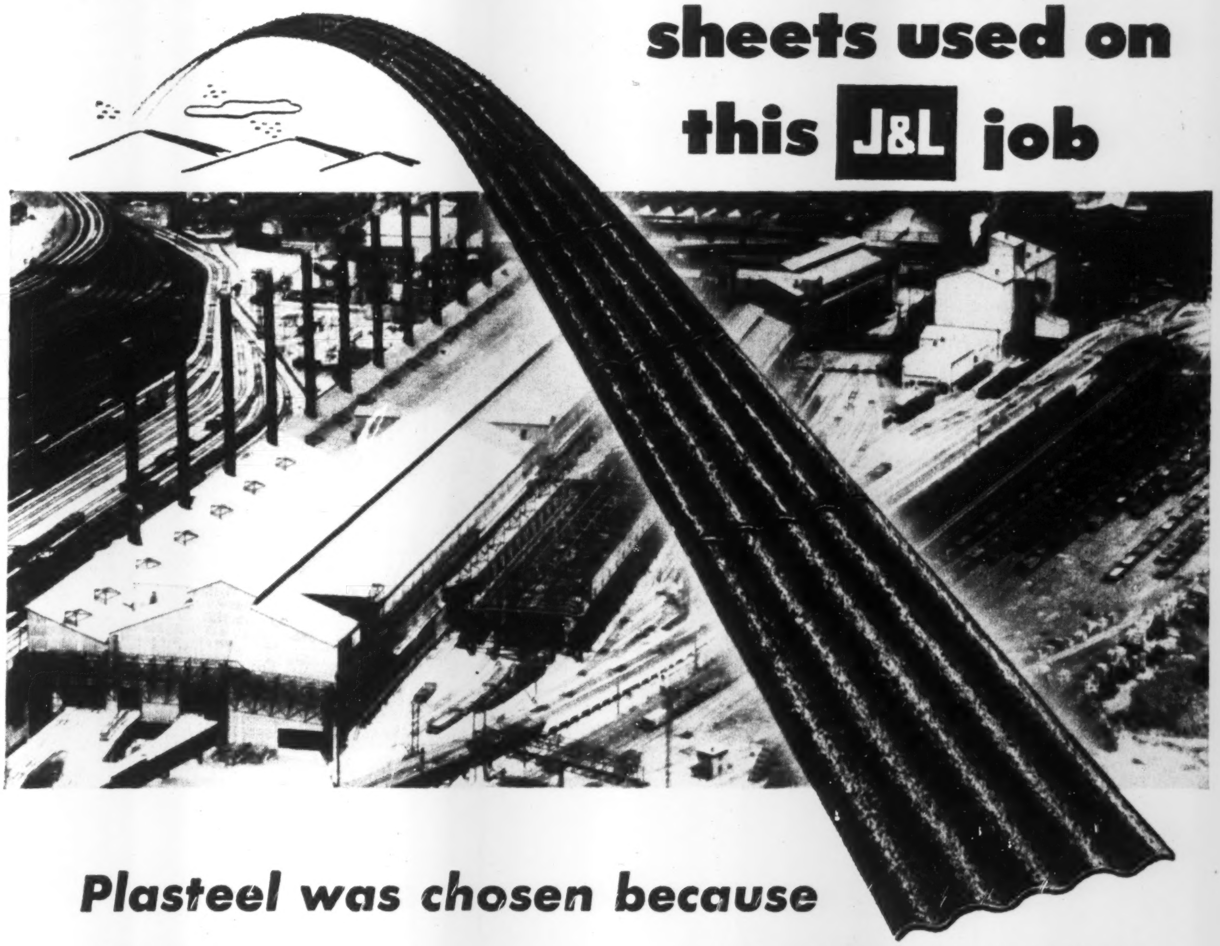

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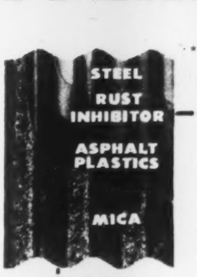

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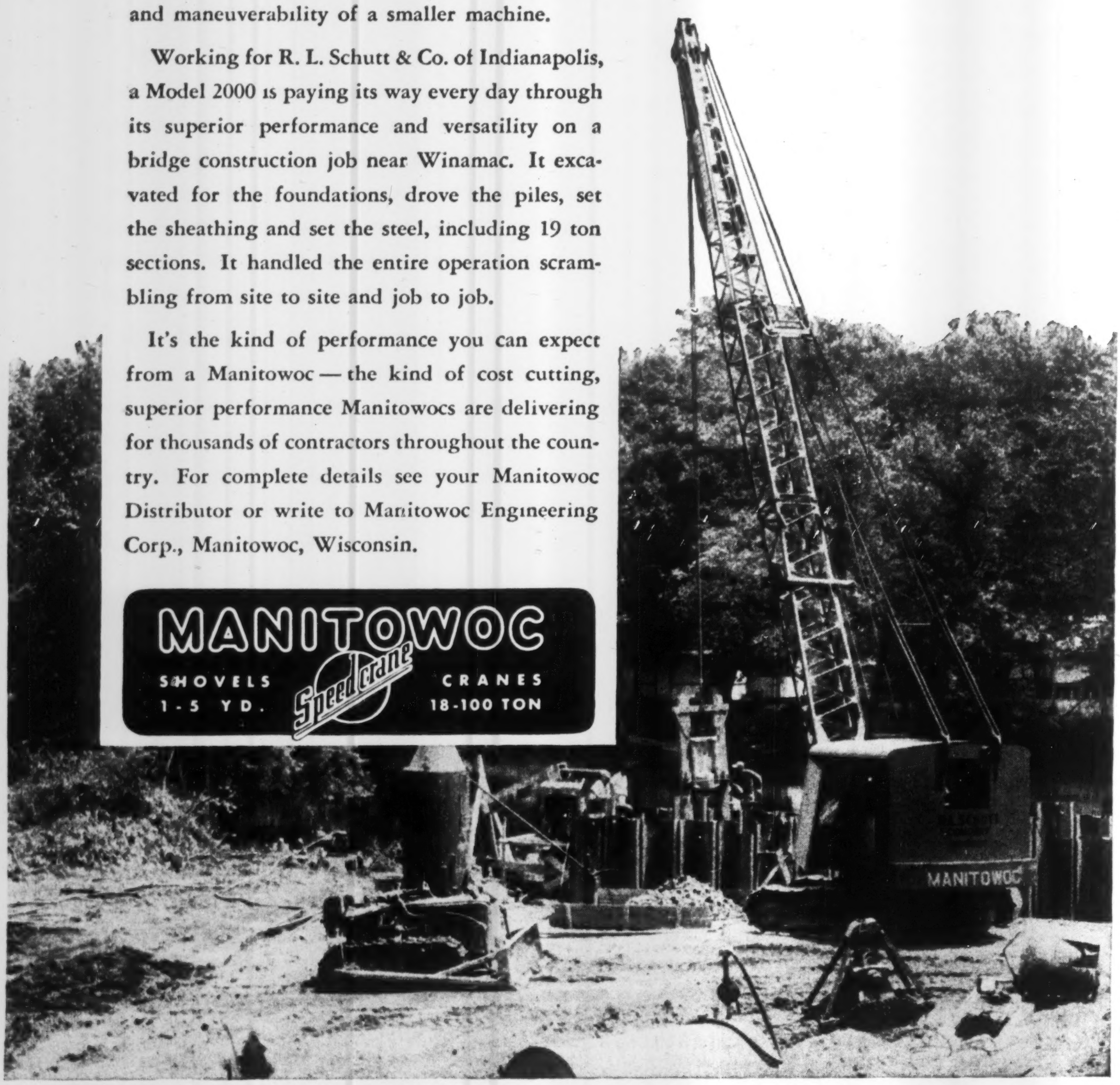

of its income from oil revenues for the financing of this construction. Total royalties from Iraq oil production for the year ended March 31, 1953, reached nearly $100 million.

Iraq believes that mineral resources like oil are expendable while the all-important land is self-perpetuating, and they therefore want to carry out the greatly needed irrigation and flood control while the money lasts. At the moment the average Iraqi citizen lives at a sub-subsistence level, while the yearly flow of the Tigris and Euphrates rivers, if controlled, could turn the river valleys into the richest agricultural area in the Middle East.

• Flood and drought—Destructive floods and the droughts that so often follow them in the Tigris and Euphrates valley cause great damage to crops and threaten cities like Baghdad along the rivers. Once the water is harnessed, these two dangers will be eliminated except in the most extreme case, and even in the driest years there will be water for the land.

Of the 14,000,000 acres involved in the planned irrigation, 6,000,000 acres will be newly irrigated land on which the government intends to settle the vast number of landless peasants. The other 8,000,000 acres of land are at present cultivated on a partial basis, but the lack of sufficient drainage and the largely unregulated irrigation on this land limits its productivity to a fraction of what it might be.

In the long-range scheme, a great deal of present pumped irrigation will be replaced where practicable with gravity flow from the new barrage dams to be built across the rivers. Large natural land depressions in the river valleys are to be used for flood storage.

The first of these depressions, Wadi Tharthar, is being developed by the British contracting firm of Balfour Beatty, London. This work entails the digging of a canal 40 miles long from the Tigris, above the city of Samarra, to the depression. The Wadi Tharthar encloses an area of 5,000 sq mi and could absorb the whole flow of the Tigris for four years. A barrage to divert the flood flow of the Tigris into the huge depression is being built above Samarra by the German contractor E. D. Zubin, Duisberg.

In the design stage are three other projects for the irrigation plan. These are the Hillah canal system, the Gharraf diversion dam and irrigation canal system, and the Nasiriyah diversion dam and irrigation system. These works are being designed by the New

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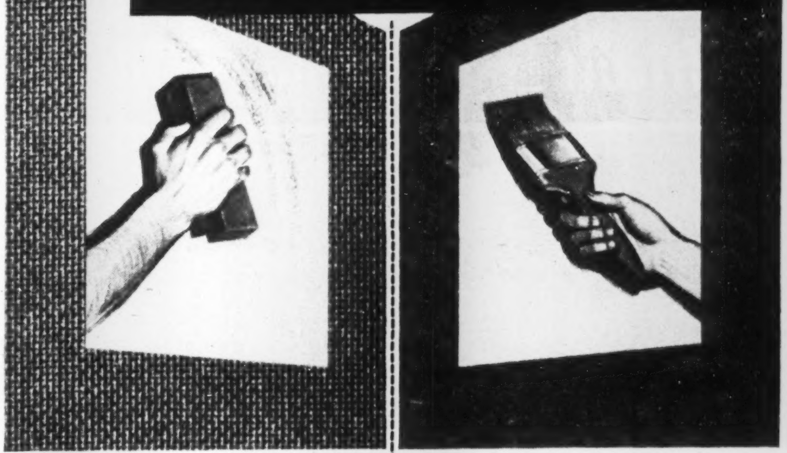

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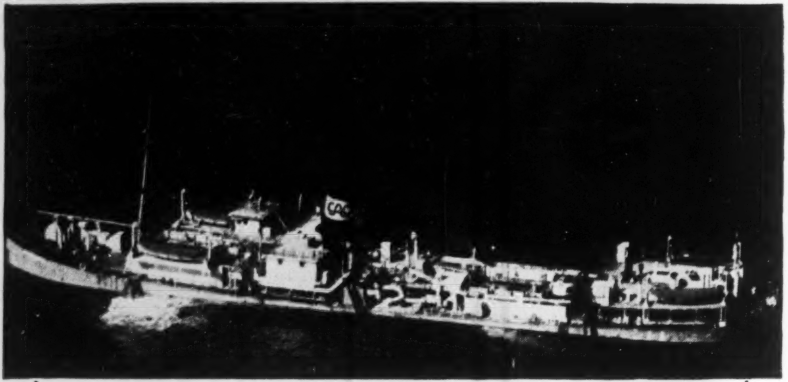

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York consulting firm of Knappen-Tippetts-Abbett-McCarthy who also worked out the master plan for the whole irrigation and flood-control 25-year plan.

Water supply discovery may mean port for India

A significant discovery of ground-water resources has been made in the desert area of Western India. The discovery may mean the development of a new Indian seaport on the Gulf of Kutch.

The discovery was reported by George C. Taylor, Jr., a geologist of the U. S. Geological Survey who recently returned to the United States after more than two years of service as a ground water adviser to the Indian Geological Survey under the U. S. Technical Assistance Program.

Lack of adequate water supply has been a deterrent to the planned construction of a modern harbor at Kandla, now a small landing point on the Gulf of Kutch. Construction of the new facilities at Kandla will relieve shipping congestion at Bombay. Taylor reported that assured supplies of water up to 10 million gallons per day were discovered within 20 miles of Kandla. Since the discovery a supply of more than 2 million gallons per day has been developed.

International briefs . . .

• **Nigeria survey**—A mission from the International Bank for Reconstruction and Development left Washington in mid-September to carry out a general survey of the economy of Nigeria, at the request of the government of that country.

• **Water supply**—The first phase of a project that will provide a water supply to the city of Mayaquez, Puerto Rico, utilizing waters of the Canas River, has been approved by the island's planning board. The $1.4-million initial project will include a filtration plant, pipelines and a diversion dam on the river. Eventual cost of the project, to be built by the Puerto Rico Aqueduct Sewer Authority, will be more than $13 million.

• **Colombian refinery**—Empresa Colombiana de Petroleos has contracted with the Foster Wheeler Corporation of New York for preliminary construction work on an expansion of the existing oil refinery at Barrancabermeja.

• **Russian hydro**—Russian reports say

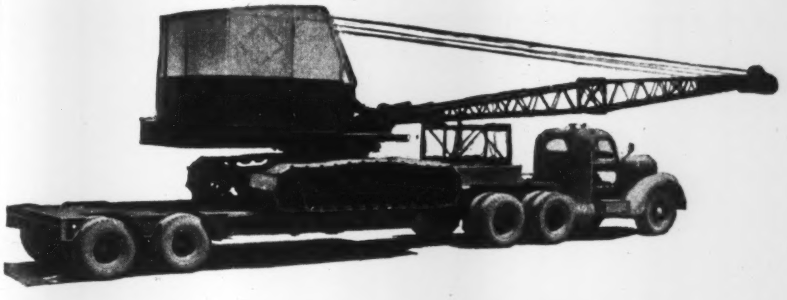
that initial pouring of concrete for the foundation of the Soviet's planned 2,000,000-kw Stalingrad hydro-electric plant will take place this month. The plant, with another installation being built at Kuibyshev, is part of a general development of resources of the Volga River.

• **Hydro for Africa**—Consideration is now being given to establishing a hydro-electric program in Basutoland, in the Orange Free State of Africa, by damming the upper reaches of the Orange River to establish a reservoir that would completely revolutionize the agricultural economy of the area. The estimated cost of the multi-purpose project would be $34 million. The plan calls for the construction of a dam in a 500-ft. deep gorge. A reservoir 90 miles long would be formed and would supply the system with 150,000 kw of power. The area is rich in asbestos mines, and the Colonial Development Corp. plans to plant pine forests and begin paper production in 1958.

• **River development**—The National Economic Council of the Philippines has started work on planning the Marikina River development project —a multi-purpose scheme aimed at boosting agricultural and development production in the Manila area and to control floods and improve sanitary conditions in the city itself. Cost of the project is estimated at $15 million.

• **Spanning Messina Strait**—While engineers and financial experts are still debating plans for construction of a suspension bridge across the Strait of Messina between the island of Sicily and the Italian mainland, the Italian government is now at work building a $1.5-million quadruple line single-span overhead transmission line to bring current from the mainland. The span will be 4.5 kilometers long, with aluminum cables over a steel core. A 190-meter high tower will carry the cable on the Sicilian side. Work on the tower foundations began in 1952.

• **Colombian planning** — Regional plans for Bogota and Boyaca are being discussed by Colombia's National Planning Council. They call for a budget of capital expenditures over the next six years of $106-million. Of this $56 million will go towards expanding Bogota's power generation at the Laguneta plant and in widening that city's aqueduct. In the Boyaca Department, where the Paz de Rio steel mill is located, the council is planning extensive public utilities.



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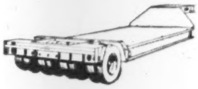

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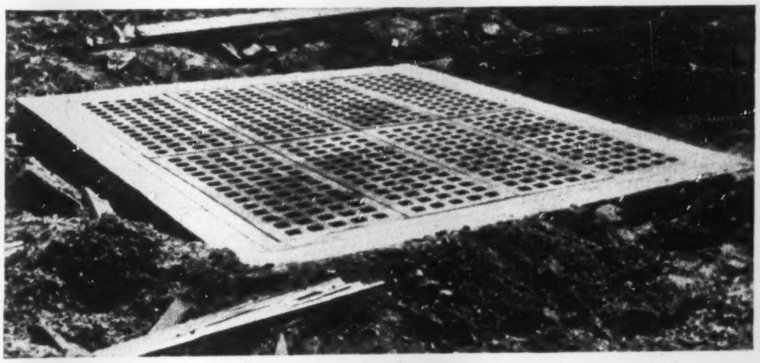

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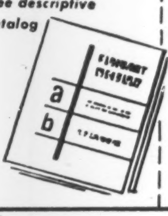

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Modern Aggregates Plant in Operation at Aden

Plant installed by Bechtel helps build new 100,000 barrel-per-day oil refinery for Anglo-Iranian Oil Company

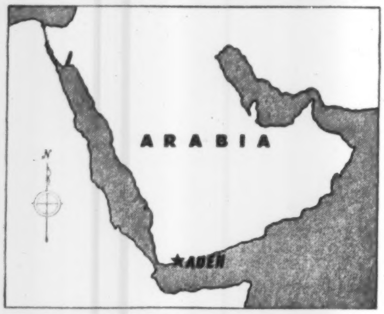
Anglo-Iranian Oil Company's new 100,000 barrel-per-day refinery, located at Aden near the southernmost tip of the Arabian peninsula, will be constructed with aggregates produced by one of the world's most modern all-purpose quarry plants.

The plant was engineered and manufactured by PIONEER Engineering Works at the request of Bechtel Corporation of San Francisco. It is supplying crushed stone for docks, jetties, piers, and concrete aggregates to be used in construction of the giant refinery and its attendant facilites.

One-half million yards of aggregates

Size of the project is shown by the fact that eventual plans call for use of nearly one-half million yards of aggregates. It is expected that between 12,000 and 15,000 construction workers recruited from most of the free nations of Europe and Asia will be employed on the job.

Bechtel, one of the world's foremost international builders, have used PIONEER equipment for a number of years, so it was natural that they called upon Coast Equipment Company, PIONEER's San Francisco distributor, for help in obtaining a high quality plant of sufficient capacity, simple operation, and low maintenance.


ARABIA
N
ADEN

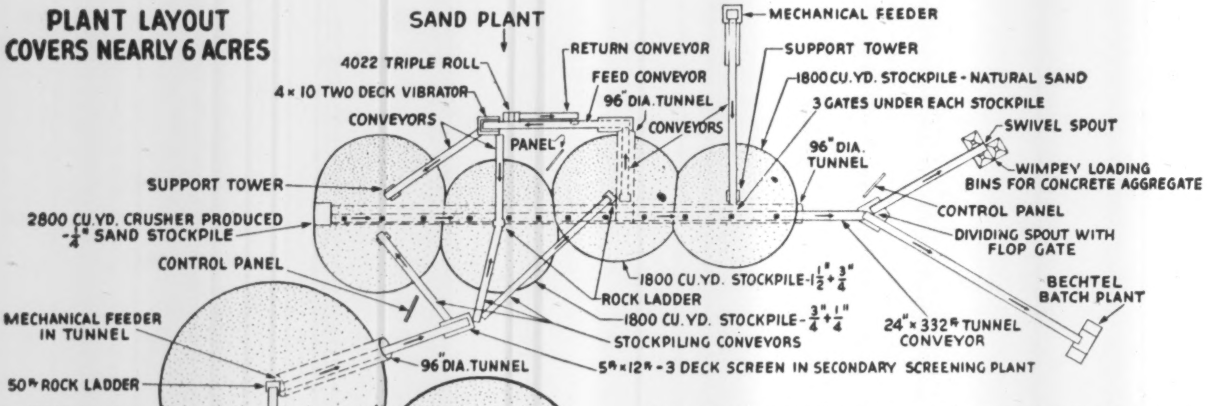
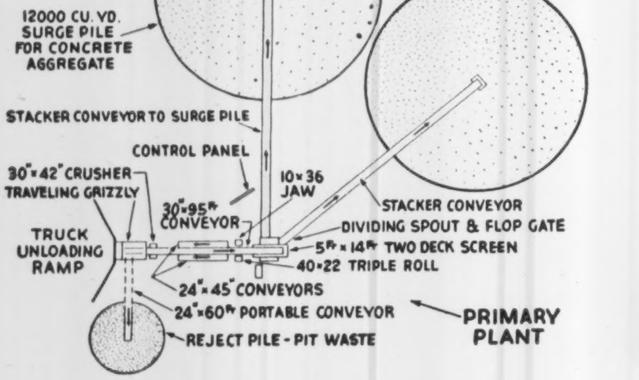
There was, of course, considerable preliminary work to be accomplished. First, a PIONEER engineering-geologist was sent to London to develop tentative plans for the big plant which was to supply materials for both Bechtel and the British joint contractor, George Wimpey & Co., Ltd. Then, at Bechtel's request, PIONEER's engineer went to Aden to survey possible quarry and plant sites.

A detailed examination of available aggregate sources disclosed that careful testing and analysis would be needed. With the material source and concrete-aggregate mix thus scientifically selected, PIONEER could assure Bechtel and Anglo-Iranian that all possible precautions had been taken to provide a Portland cement concrete of the highest durability and permanence.

The result is a complete, high production plant which has been called the world's most modern.

Occupies six acres

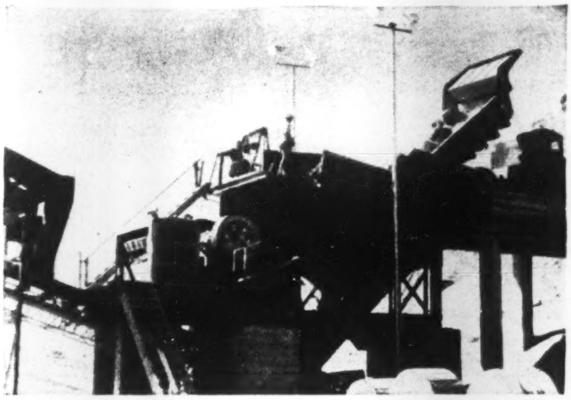
Although it occupies six acres, it can be operated by a crew of as few as five men. This is made possible by use of push-button stations on four strategically placed control panels. From these, conveyors and screens can be operated, material gates opened and closed, and the entire flow governed by remote control. Surge piles of materials requiring further processing to meet rigid specifications and finished product piles for concrete aggregates are provided.

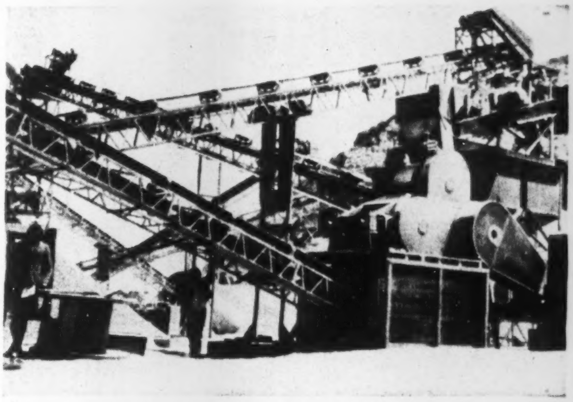
PLANT LAYOUT COVERS NEARLY 6 ACRES

SAND PLANT
4022 TRIPLE ROLL
4 × 10 TWO DECK VIBRATOR
CONVEYORS
PANEL
RETURN CONVEYOR
FEED CONVEYOR
96" DIA. TUNNEL
CONVEYORS
MECHANICAL FEEDER
SUPPORT TOWER
1800 CU. YD. STOCKPILE - NATURAL SAND
3 GATES UNDER EACH STOCKPILE
SWIVEL SPOUT
WIMPEY LOADING BINS FOR CONCRETE AGGREGATE
96" DIA. TUNNEL
CONTROL PANEL
DIVIDING SPOUT WITH FLOP GATE
BECHTEL BATCH PLANT
SUPPORT TOWER
2800 CU. YD. CRUSHER PRODUCED -¼" SAND STOCKPILE
CONTROL PANEL
1800 CU. YD. STOCKPILE-1½"+¾"
ROCK LADDER
1800 CU. YD. STOCKPILE-¾"+¼"
STOCKPILING CONVEYORS
24" × 332 ft TUNNEL CONVEYOR
MECHANICAL FEEDER IN TUNNEL
96" DIA. TUNNEL
5 ft × 12 ft - 3 DECK SCREEN IN SECONDARY SCREENING PLANT
50 ft ROCK LADDER
12000 CU. YD. SURGE PILE FOR CONCRETE AGGREGATE
STACKER CONVEYOR TO SURGE PILE
CONTROL PANEL
30" × 42" CRUSHER
TRAVELING GRIZZLY
TRUCK UNLOADING RAMP
30" × 95 ft CONVEYOR
10 × 36 JAW
STACKER CONVEYOR
DIVIDING SPOUT & FLOP GATE
5 ft × 14 ft TWO DECK SCREEN
40 × 22 TRIPLE ROLL
24" × 45" CONVEYORS
24" × 60 ft PORTABLE CONVEYOR
REJECT PILE - PIT WASTE
PRIMARY PLANT

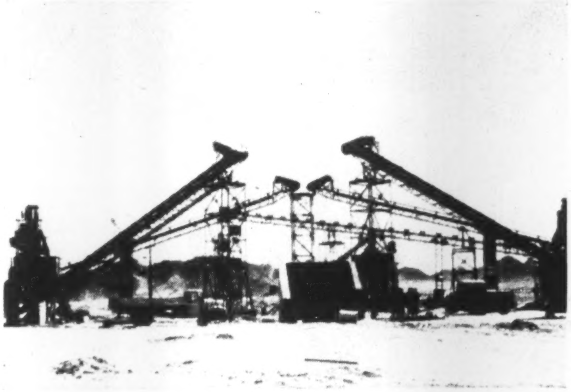
Surge pile of crusher-run materials to be screened into specification sizes for Bechtel or Wimpey as needed. In background is PIONEER stacker conveyor for surge pile of material for further processing.



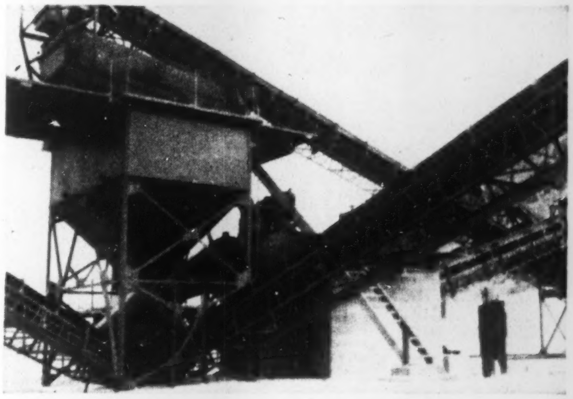
PIONEER 163 Primary Unit, consisting of 48″ x 14′ Traveling Grizzly Feeder and 3042 Jaw Crusher, receives tough trap rock from quarry, reduces it to minus 8″. Material then goes via 30″ x 95′ conveyor to secondary crushing cycle.



In secondary crushing plant, material is separated on a 2-deck 5′ x 14′ PIONEER Mesabi Vibrating Screen. Plus 6″ goes to 1036 Jaw Crusher. Material from 6″ down to top specification size goes to 4022 Triple Roll. Both products are returned in closed circuit.



Stockpiling and Sand Plant delivery conveyors. Note tunnel abutment in foreground. In the distance, delivery conveyor from product tunnel to batch plant is visible.



Sand Plant, where surplus — 1½″ + ¾″ is used to manufacture specification sand. This enables the contractor to utilize the entire quarry feed as pay material.

The first of several shipments left PIONEER's Minneapolis factory in December, 1952. Eighteen flat cars were needed to transport the entire plant.

All equipment arrived at Aden intact and undamaged. There, a PIONEER erection engineer was waiting to supervise its installation. Sixty days later it crushed the first rock.

The "plant" actually consists of four major units . . . a primary and secondary crushing plant, a secondary screening plant, product stackers with reclaiming system, and a sand plant.

Hard, tough trap rock is blasted from a cliff 1000 feet away. After reduction to -1½″ by the three primary and secondary crushers, it is surge-piled over a mechanical feeder and conveyor located underground in a reclaiming tunnel.

Material is then conveyed to a sizing screen which separates it into three sizes (-1½″ + ¾″, -¾″ + ¼″, and -¼″) each of which is stockpiled over a long reclaiming tunnel. Under each of these product piles are three electrically-controlled, air-activated gates which allow the operator to feed selected sizes onto the tunnel conveyor.

This conveyor is equipped with twin spouts and a solenoid-controlled flop-gate so it can supply either the batch plant or any one of three 21-yard bins. When desired, excess material from the -1½″ stockpile over the tunnel can be sent directly to the sand plant.

Since the plant began production, operation has been almost continuous, and original performance expectations are being exceeded.

This is another example of outstanding performance by PIONEER quality-built equipment . . . experienced by a contractor who again is finding that PIONEER extra capacity, rugged dependability and simplicity of operation are helping him make a considerable saving in production costs.

With competition as rough as it is, it takes close bidding to get a job these days. Now, more than ever, it's important to have that PIONEER EDGE on *your* side. It isn't the original cost of equipment that counts most . . . it's the lower cost at which you can produce sand and crushed stone that tips the balance in your favor.

For details on how this equipment will help you save money on your next job, write PIONEER Engineering Works, Inc., Minneapolis, Minnesota. (A subsidiary of Poor and Company, Chicago.)

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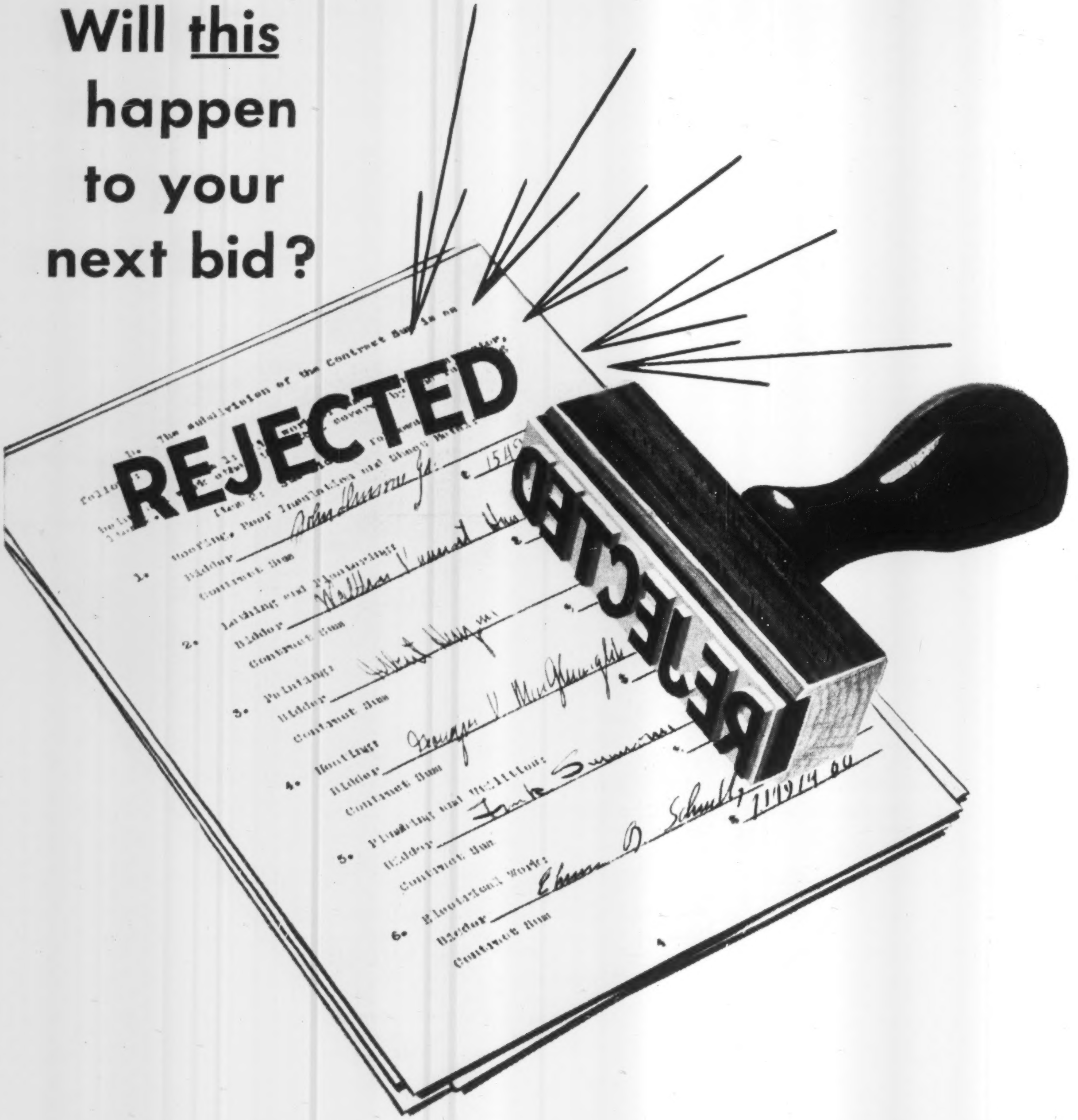

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FIELD AND OFFICE

Scrub team wins with one pass

The annual duel between algae deposits and the scrub team at Argentine Reservoir, Kansas City, Kan., ended in disastrous defeat for the algae. Taking no chances this year, the scrubbers' mentor, O. G. Kuran, superintendent of water distribution, had bolstered his line with three commercial floor machines.

The machines are of a standard cylindrical type fitted with 30-gage wire brushes and were used without mechanical modification. Results with them have been impressive. Cleaning is completed in one-third the time required by hand scrapers and with half the crew formerly required. Furthermore, the mechanical scrapers shave off most of the "roots", getting down to the concrete itself, and thereby retard new growth.

Until last year, the only way to combat the algal growths was frequent scraping by hand with steel spud bars. It took a crew of 24 to 30 men two or three working days to do the job. "Even then it wasn't a good job," said Mr. Kuran. "The reservoir bottom isn't entirely smooth and the scrapers tended to catch on it. Also we never could get down to white concrete."

Under Kuran's direction, various scraping methods were explored. The most satisfactory one proved to be a 7.3-hp gasoline powered industrial floor machine fitted with a 16-in. wide wire brush that revolves at 1,500 rpm.

The scrubbing operation now requires only eight hours and twelve men. Three teams of three men are armed with fire hoses to keep the area drenched and also to flush the loosened deposits down a central drain. Two men are equipped with the floor machines and one man is held in reserve.

The cleaning of the bottom of the reservoir was a simple scrub and flush operation. However, cleaning the 45-deg sloping sides of the reservoir required that the machines be held in place by ropes tied to trucks moving slowly around the rim.

Kuran estimates that the savings in manhours were enough to pay for one of the machines in three or four cleanings.

The algae removal process was planned and directed by Mr. Kuran. Work was done with the cooperation of R. J. Duvall, manager of production and distribution; Albert Runsey, chief chemist; and Lawrence Wilson, president of the Kansas City Board of Public Utilities. The original tests were arranged with the assistance of the G. H. Tennant Co., manufacturers of the scraping machines.

Water cooling with wells used in pairs

Several installations around Louisville, Ky., make use of well water for cooling and then return the cooling

just nail 'em in...
pour your concrete

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WITH LABYRINTH WATERSTOPS

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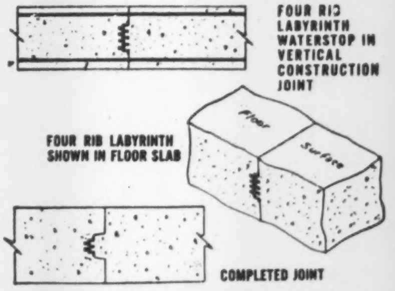
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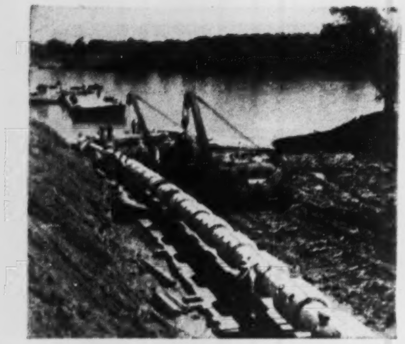

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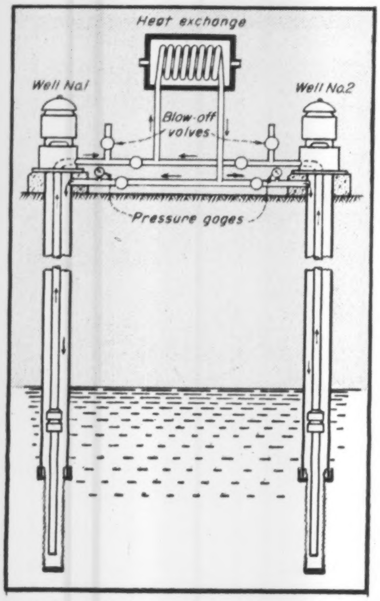


FOR DRAWING AND DISPOSING of cooling water, two wells take turns.

water to the ground. When it was found impossible to keep the return wells from clogging unless they were flushed occasionally, we tried putting a pump on a return well and periodically reversing it, pumping it to waste, to keep it open.

It was only a step beyond this to the idea of using two wells as a pair and reversing the direction of flow when necessary. The particular pump arrangement in the accompanying sketch evolved and has been patented. The idea is to make both wells nearly identical, seal them, and provide gages, so that when the return well starts to clog with mineral matter, it will be indicated. The system is then reversed. If well No. 1 is cut off as the production well, No. 2 will have to be let pump to waste for a matter of minutes to flush off accumulated material tending to clog it; then the blow-off valve is closed and supply lines are opened. Water supplied from well No. 2 is used for cooling, then discharged into well No. 1; when the gage on well No. 1 shows a significant rise in pressure indicating clogging, flow is reversed again.

The period between reversals may be days or weeks, depending on underground conditions.

The method does not pollute nor appreciably reduce groundwater supplies. Discharge of coolants to the earth may have economic advantage in areas where discharges to sewers are metered and charged for.

Generally, the rise in temperature of water being recharged to the earth is relatively slight and not considered apt to increase groundwater temperature greatly. It is normally around 60 deg F the year around in this latitude. However, the possibility does exist and should be considered. Perhaps the ultimate in use of the water would be dual use—for heating in winter as well as for cooling in summer—with no resulting net change in groundwater temperature.—H. B. DAVIDSON, ANDRIOT-DAVIDSON CO., LOUISVILLE, KY.

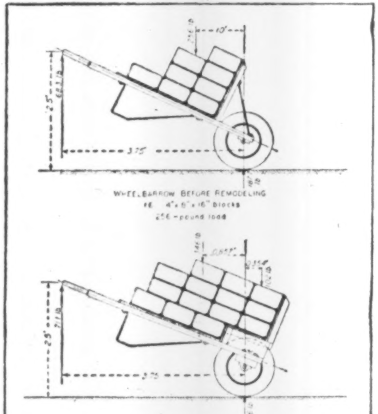
Big return on small investment

With an expenditure of three dollars per wheelbarrow in labor and material, John Scott, our foreman for masonry work on the J. D. Hedin contract at the Minneapolis, Minn., Veterans' Administration Hospital, increased the payload of his flat bottomed wheelbarrows by 75 per cent.

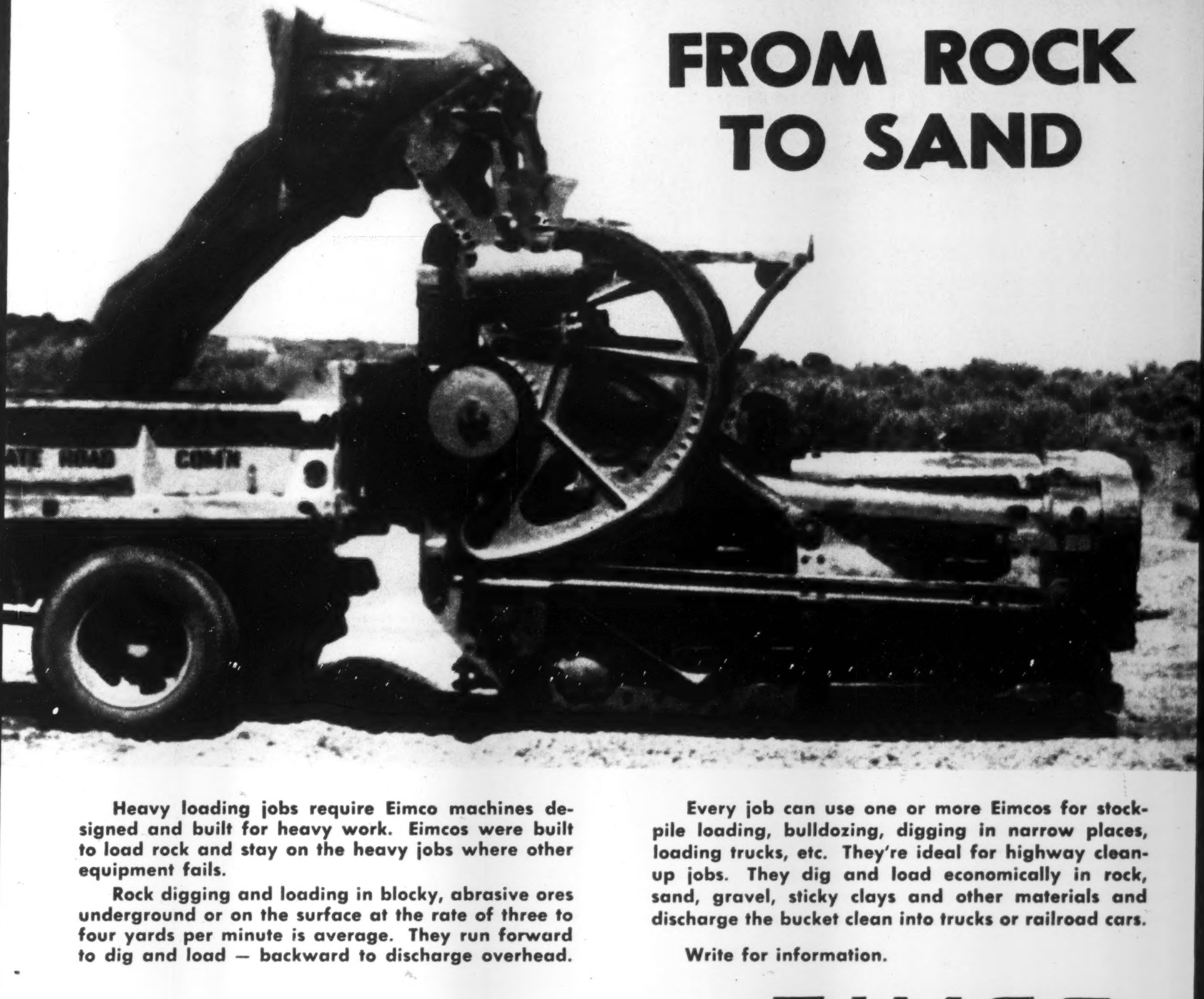
By rebuilding the bed of the wheelbarrow he was able to shift the load forward, above and in front of the wheel. In this manner the load of 4 x 8 x 16 in. cindercrete blocks could be increased from 16 to 28 blocks. Actual weight carried amounted to 192 lbs more, but the increase in handle load was only 2.8 lbs.

In effect the new arrangement permits a 700-per cent return on the added manpower investment since, once the load is in motion on rubber tires, low friction bearings and good runways the additional power required to keep it moving is very little.—R. A. PHELPS, SUPERINTENDENT OF CONSTRUCTION

(*Field and Office continued on page 243*)



FROM ROCK TO SAND



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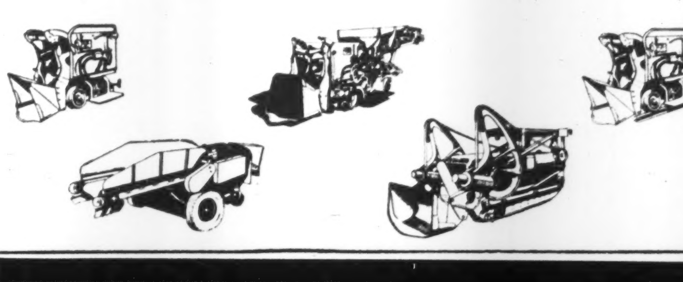

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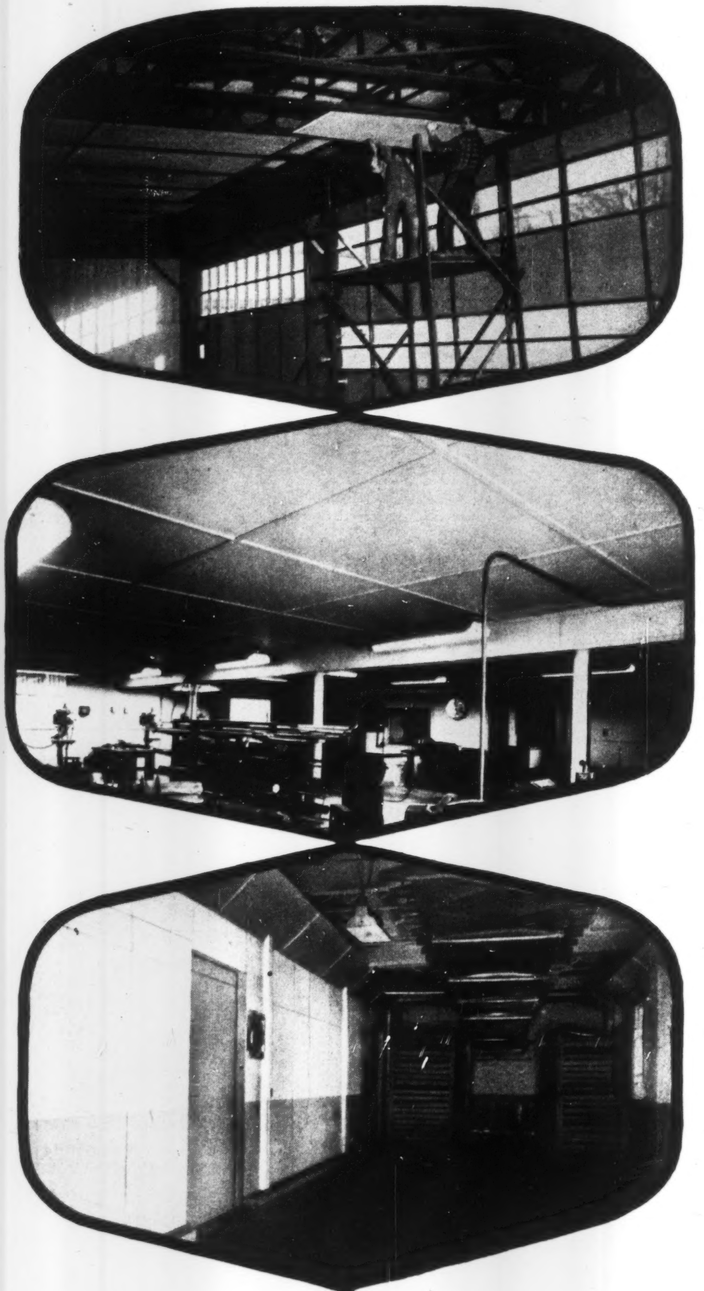

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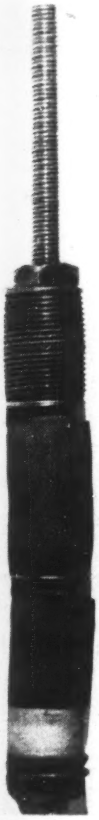


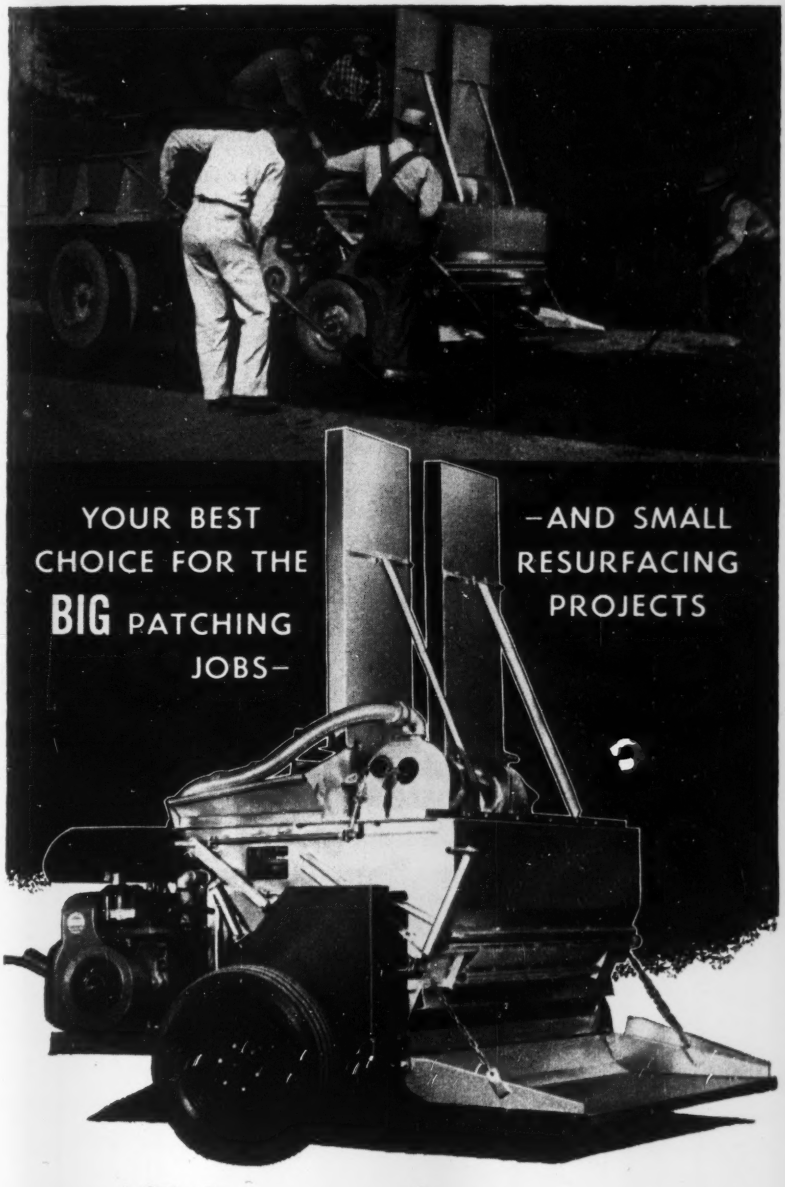
TWO LENGTHS of rotor tube, two inches long and ground to one-inch outside dia proved to be successful packing.

Packer developed for sealing drill holes

Six exploratory drill holes located in the basement of the power plant of the Salt River Power District, Ariz., at Horse Mesa Dam posed a unique problem. The holes were drilled some years ago to varying depths into bedrock below the dam and had not been grouted. There was concern that pipe nipples at the top of the holes might rust out or give way, allowing considerable water to flow into the basement or, possibly, spray onto the electrical installations in the plant.

Little was known of the condition of the pipe nipples, the exact size of the holes, or the water pressure within these holes as rigid sheet iron cover boxes had been installed over these holes in past years as a protective measure. It was believed that these boxes were inadequate and that a more permanent means should be made to seal the holes.

The decision was made to set an expandable packer approximately ten



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In any season . . . under wet or dry conditions . . . this new McConnaughay HTD-LP Mixer can assure you the fastest, most economical production of bituminous paving mixtures (hot or cold) for big patching jobs, small resurfacing projects, driveways and parking areas. Working right on location, it provides the exact amount of paving material needed . . . never too much or too little. With mixer and heating unit combined, it will reactivate and heat up to 20 tons of stock pile mixture per hour, prepare up to 8 tons of hot or 18 tons of cold asphaltic mixtures per hour, dry various types of wet aggregates quickly, remove both moisture and solvents from bituminous mixtures. Other features include low pressure burner, blower for fuel atomization, stacks for removal of gases, 6 cubic foot mixer capacity. Write, wire or 'phone for details and specifications.

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Timber Structures, Inc., fabricated and assembled 773 Arch-Teco bowstring timber trusses, 71' span, with Teco Wedge-Fit connectors for Parr Warehouse Co. project at Franconia, Va. Ward & Bowles, architects; Barrett & Hilp, contractors.

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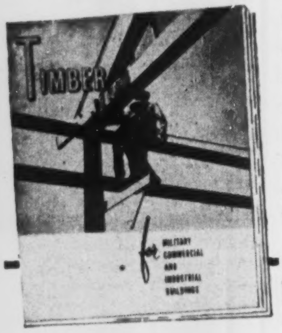
Specify Arch-Teco timber trusses for economy, availability and speed of construction.

The new government warehouse, sprawling over 28 acres in Virginia, is one of the nation's largest engineered timber structures. It is an outstanding example of the savings in time, material and money, made possible by the use of Teco connectors in fabricated timber construction.



Experienced fabricators, in all sections of the country, can supply prefabricated, ready-to-erect timber roof trusses for large or small structures. Names and addresses of these fabricators are listed in the FREE booklet, "Timber for Military, Commercial and Industrial Buildings" — send for your copy TODAY.

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feet in the hole and pack the top portion of the hole with two feet of non-shrink mortar above the packer and the remainder of the hole with 1:2 cement mortar.

It was assumed that the holes were of 1¼ or 1½ in. in dia. and that water pressures might be from 20 to 60 psi. A pressure gauge attached to a drill hole elsewhere in the dam had registered 20 psi, and there were reports of 60 psi in some of the holes to be sealed.

Considerable preliminary experimentation was involved developing the expandable packer for this pob. A ⅜-in. rod, 13 ft. long was to be the means of inserting the packer to position. The problem was to have a packer of a diameter that would allow water to flow around it while being inserted and yet that would expand to the inside of the hole stopping all water flow and holding its position in the hole against water pressure.

An attempt was made to use a 6-in. length of foam rubber turned to 1-in. dia. as packer material. The device was tested by inserting the packer in 1¼-in. pipe with water flowing and running the nut down to expand the rubber. This was unsuccessful since the foam rubber lacked the required density and therefore would not hold in the pipe against water pressure.

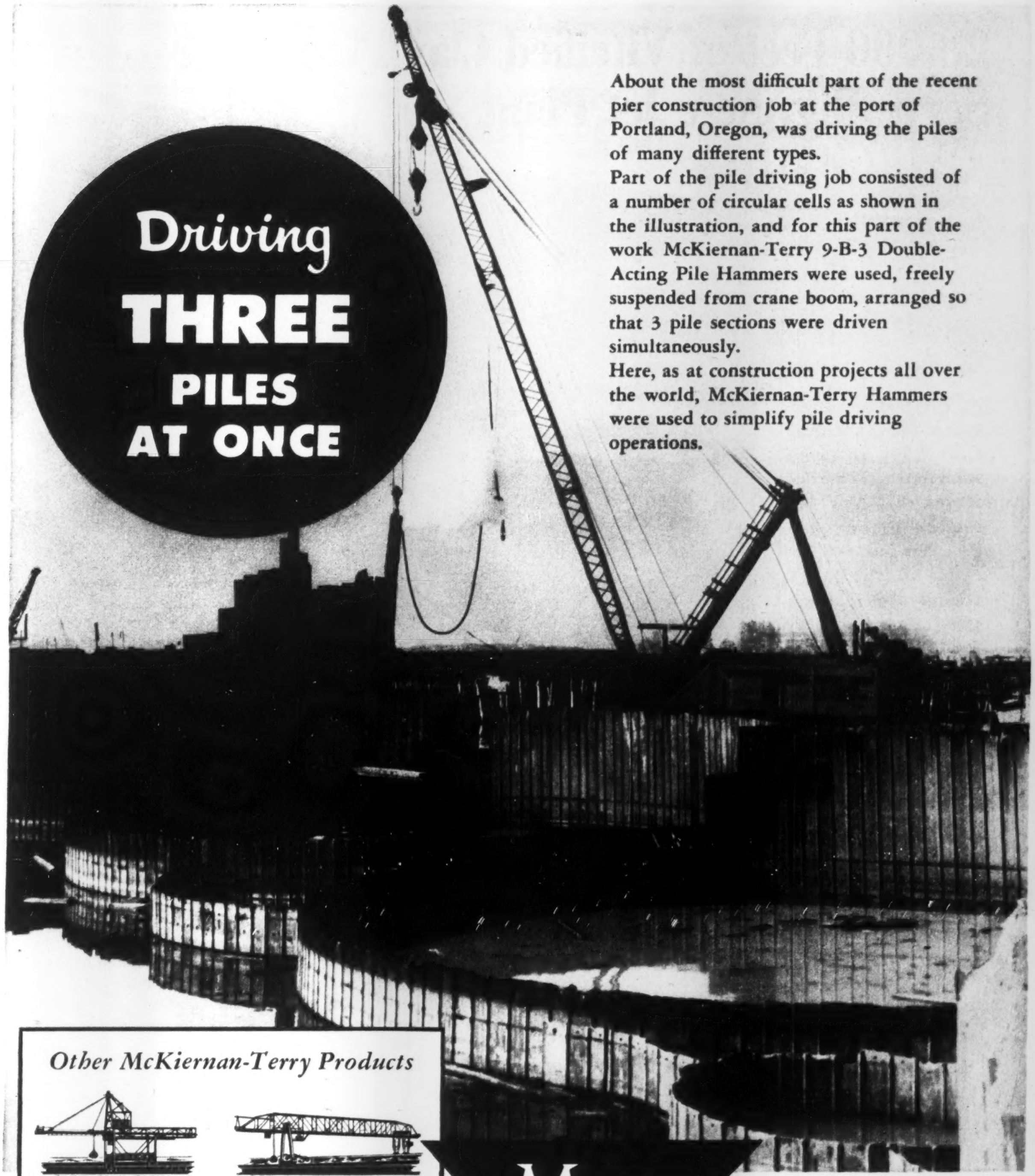
A ¾-in. I. D. x 1½-in. O. D. rubber rotor tube was tried next. This tube was ground to 1-in. O. D. and cut to 6-in. length. This tube also failed against water pressure. After various changes, a successful packer was devised using two 2-in. lengths of rotor tube. One tube was secured to the ⅜-in. rod with a metal band, both tubes were separated from the tightening nuts and each other by metal washers and were backed by 7/16-in. rubber slip joint washers. The packer was expanded by turning a ½-in. pipe slipped down over the ⅜-in. rod.One end of the pipe was adapted to fit the tightening nut at the packer.

After removing the cover boxes, the holes were reamed with flue brushs, the packers set, water blown from the holes, the holes slushed with grout, the bottom two feet packed with non-shrink mortar and the remaining portion of the holes packed with a 1:2 cement mortar.

It was estimated that water pressures were from zero to 30 psi in the holes. The packers worked successfully in all holes.

Further information on the sealing of these drill holes may be obtained from Carl Bowers, Inspector, Engineering Dep't., Salt River Power Dist. P. O. Box 1980, Phoenix, Ariz.

Driving THREE PILES AT ONCE



About the most difficult part of the recent pier construction job at the port of Portland, Oregon, was driving the piles of many different types.

Part of the pile driving job consisted of a number of circular cells as shown in the illustration, and for this part of the work McKiernan-Terry 9-B-3 Double-Acting Pile Hammers were used, freely suspended from crane boom, arranged so that 3 pile sections were driven simultaneously.

Here, as at construction projects all over the world, McKiernan-Terry Hammers were used to simplify pile driving operations.

Circles, circles, circles . . . all formed of steel sheet piling driven by a McKiernan-Terry Pile Hammer for the pier at Portland, Oregon. Consulting Engineer, Frederic R. Harris, Inc., New York City. Contractor, Guy F. Atkinson Company, San Francisco, Calif.

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WELDING is a big operation in this new Jet Plant. And that means a lot of acid waste must be handled by the sewerage lines. Specifications called for Vitrified Clay Pipe.

Clay Pipe is the *only* sewer pipe that can't be deteriorated by acids and other chemicals. Regardless of the corrosive wastes that may flow through the line in future years, Clay Pipe is *sure* to last. ***It's guaranteed for 50 years.***

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Seepage through dam checked by injecting chrome-lignin

An outgrowth of soil-stabilization studies for military purposes is the discovery that the flow of water underground can be stoped by injection of lignin in combination with a commercial grade chromium compound. Lignin is a sulphite waste product from the manufacture of paper. In tests made on a small privately owned reservoir, loss of water through a sand and gravel formation at one side of the pond was checked successfully.

Test injections made subsequently on the relatively impervious embankment forming the pond revealed that large quantities of the chemicals could be pumped into that type of soil, indicating that the method is applicable to a variety of soils.

The chrome compound and lignin combine to form a gel that fills voids in the soil being treated. The chemicals can be mixed in a water solution prior to use, and the setting time can be controlled so that injection by pressure grouting is possible before the gel formation takes place. The solution can be made so "thin" that it can be pumped into fine sands and possibly into silts. It can be pumped into saturated soil in such a manner as to replace much of the water in the soil, after which it will set.

The viscosity of such solutions can be increased, if necessary, for use in relatively pervious soils to block them off prior to treatment of finer materials in adjoining areas.

Tests of the method made in an unused section of a gravel pit before the grouting work on the dam was undertaken showed that good distribution of the gel could be obtained in a natural formation of alternate layers of sand and gravel. They also demonstrated that the resulting consolidated materials had considerable stability. The sides of cuts made through it stood up without support.

This pointed to the possibility of using chrome-lignin grouting to stabilize soil in foundation work, thus reducing the amount of sheeting needed, and possibly the amount of water to be handled.

In grouting to check loss of water from the small pond, injection holes in the bank were sunk to a depth of 15 ft. In some instances, the chemical grout traveled laterally as much as 45 ft. from the injection point. Injection pressures averaged around 15 psi. The same low pressures were used in tests made on the dam.

This grouting work required the pumping of 3,800 gal of solution into the soil. Due to the experimental nature of the work and unforseen delays the actual cost of the undertaking was well above what it would be for any future operation using the same method. Analysis of the cost figures indicates, however, that the cost of the chorme-lignin method under normal conditions should be competitive with conventional cement-grouting.

Inventor of the chrome-lignin process is Prof. Julian C. Smith of the School of Chemical and Metallurgical Engineering at Cornell University. Collaborating with Prof. Smith in the engineering application was Prof. B. K. Hough of the School of Civil Engineering at Cornell and owner of the Hough Soils Engineering Laboratories at Ithaca, N. Y. Patents have been applied for and will be assigned to the Hough Laboratories, which will license contractors.

The grouting work described here was done by Intrusion-Prepakt, Inc., Cleveland, Ohio, licensee. Norman Liver was engineer for that firm.

NBS studies corrosion of buried irons and steels

A recent study by the National Bureau of Standards provides new information on the corrosion of certain low-alloy irons and steels in soils. Specimen plates of several of these materials (containing up to six percent of total alloying elements) together with reference specimens of plain steel were buried at 15 different test sites for periods up to 13 years.

Included in the bureau's study, conducted by I. A. Denison and M. Romanoff of the NBS Corrosion Laboratory, were specimens of copper-molybdenum open-hearth irons, nickel-copper steels, and chromium steels with and without molybdenum.

The steels containing four to six percent chromium generally lost only half as much weight as plain steel under the same conditions. However, the greater corrosion resistance of the alloy steels as measured by weight loss

LEADING CONTRACTORS USE McCarthy Drills

PUBLIC UTILITY AUGER DRILL

Bores holes from 4½" to 24" in diameter under sidewalks, roads, building foundations, railroad tracks, landscaped grounds, etc. Fithian Contracting Co., Youngstown, O., using McCarthy Public Utility Auger Drills, completes pipe line jobs, formerly taking weeks, in a few days.

SELF-PROPELLED HORIZONTAL AUGER DRILL

Will bore 6" and 8" diameter holes 120 feet horizontally at rate of six feet per minute maximum. Four individual, self-locking jacks maintain correct drilling level. In one day a New Castle, Pa., operator bored holes of various depths totaling 840 ft. through shale and sandstone, using this McCarthy Auger Drill.

Heavy Rugged Powerful

VERTICAL AUGER DRILL

Operating men who have made actual on-the-job tests find the McCarthy Vertical Auger Drill a standout for mobility, stamina, ruggedness and versatility. On a 2-million dollar, 5-mile stretch of superhighway between Hubbard, Ohio, and Sharon, Pa., The Apex Powder Co., Canton, Ohio, cut blasting costs approximately 20% as compared to air, well or churn drilling. Cutting through two large areas of concentrated rock, 150 holes 15 feet deep were bored for each blasting pattern. 3,000 cubic yards of sand rock were moved at each blast. Due to the ruggedness and mobility of McCarthy Drills, there was no time lost. For further information, write Salem Tool Co. and our distributor will contact you.

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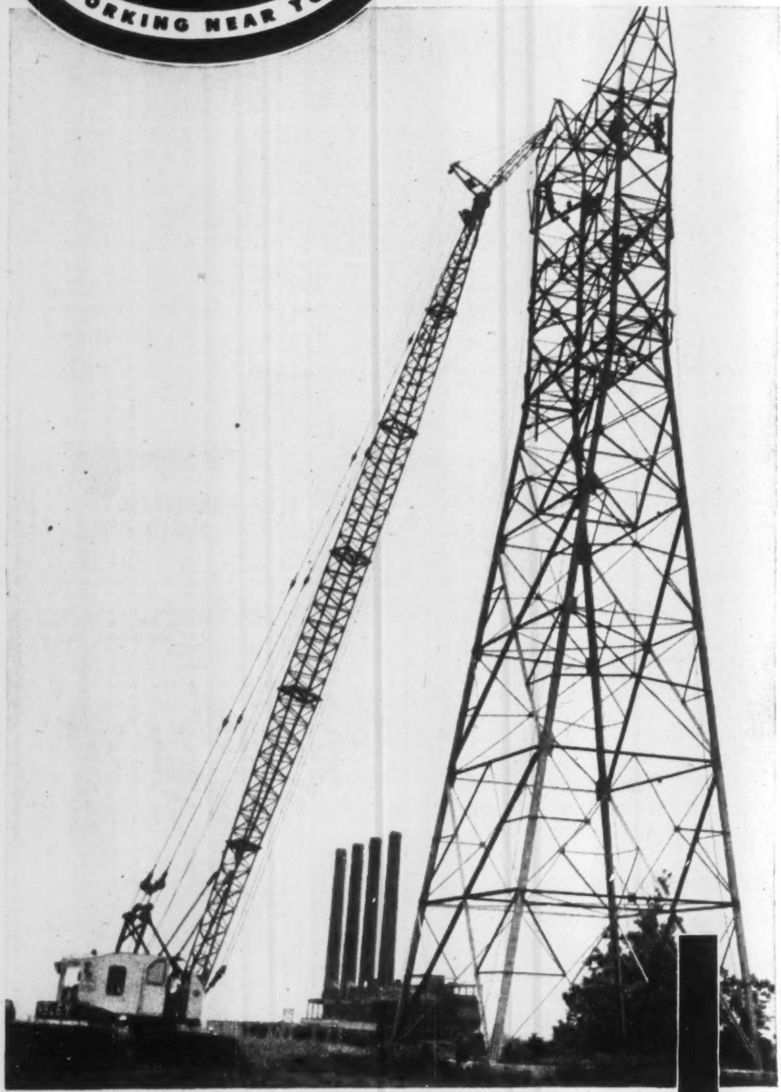

Shown here is a Type WB Crane mounted on an 8 x 4 carrier, erecting a transmission tower.

The Insley Manufacturing Corporation has been manufacturing construction equipment since 1907. The Insley Line includes excavators and cranes, 5 to 30 ton capacity—crawler or rubber mounted. There's an Insley working near you on a construction project.

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was not generally accompanied by a corresponding reduction in the maximum depth of pits. The least pitting was observed on specimens that contained molybdenum in addition to chromium.

The change in the rate of pitting with time was found to depend on the composition of the steel. Although the initial rate of pitting was greater for the alloy steels, plain steel eventually produced the deepest pits. This indicates that after the maximum period of exposure the alloying constituents induce the formation of corrosion products that tend to reduce the rate of pitting with time. In environments unfavorable to the development of protective deposits of corrosion products, deeper pitting of the alloy steels may be expected.

Provided their corrosion resistance in a prospective environment is sufficient, low-alloy steels may be of interest for certain applications because of their high strength. The NBS studies indicate that low-alloy steels in some cases may be appropriate choices for certain types of underground construction, such as piling, where mechanical strength rather than the ability to contain a fluid indefinitely, is of primary importance.

Air pollution research aided with aerosol camera

Long-sought clues to the nature of microscopic particles floating in the air are expected to be discovered by photographing them with a new Aerosol camera developed by Sanford Research Institute.

The camera, which should prove valuable in smog and fog studies, can photograph airborne solid or liquid particles as small as 0.002 in. in dia. In earlier air research, particles had to be collected on slides and examined with an electron microscope. The new camera should indicate whether or not the process of settling the aerosols on a slide alters or destroys some of them.

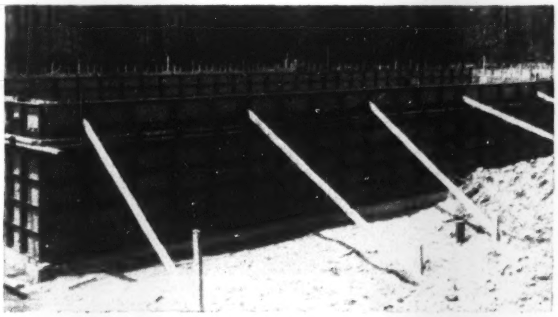
Institute scientists are putting the 500-lb pilot model of the instrument through exhaustive tests and it will undergo modification based on operating experiences.

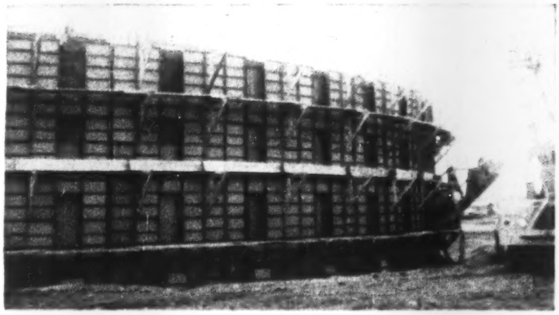
Lightweight aggregate performance studied

Structural concrete performance of lightweight aggregates from fourteen states and Canada is being correlated in a research program under way at the University of Toledo. The program is sponsored by the Expanded Shale Institute, and is under the direc-

Versatile

Atlas Compo Forms make any shape





Whether your concrete construction is rectangular, round, hexagonal, irregular, slab, battered – use the same quick-erecting, easy stripping Atlas Compo Forms over and over again for all the different shapes.

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Heights, 4', 5', 6', 7', 8'.
Widths, 12", 16", 18", 24".
Panels interchangeable, no rights or lefts.
Panels of different heights can be combined.
For low, high, round, rectangular structures, and for slabs.
Pilasters, inserts, easily accommodated.
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DESCRIPTION:

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FINISH: Embossed.

LENGTHS: 5', 5' 6", 6', 6' 6", 7', 7' 6", 8', 8' 6", 9', 9' 6", 10', 10', 6", 11', 11' 6", 12'. (Special lengths cut to order subject to inquiry.)

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WEIGHT: 56 pounds per 100 square feet of formed sheet.

Standard .032" mill finish Industrial Corrugated also available—35" width, same lengths as above.

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tion of Professors E. L. Saxer and John Seldon, of the University of Toledo Research Foundation.

S. Carl Smithwick, president of the institute, said that this is one of the most extensive undertakings of its kind with this material. The research program is a systematic effort to produce needed comparative data, based on uniform tests, for the use of designers.

In making the analysis for the institute, engineers will use a blend of four portland cements for all concrete specimens. Aggregates will be separated on standard screens and recombined to a uniform grading.

Four mixes of 2½-in. slump containing four to seven sacks of cement per cu yd will be made with each aggregate. A 3x4x16-in. specimen has been selected as the standard size. In addition to flexure and compressive strengths, shrinkage and sonic modulus will be determined.

$100,000 pipeline testing program inaugurated

Gas companies, steel industries and the Battelle Memorial Institute, industrial research laboratory of Columbus, Ohio, are joining in a $100,000-pipeline testing program.

First field tests are planned for this month along the Texas Eastern Transmission Corp. line, six miles south of Athens, Ohio. Eight of the field tests will be made on 20- and 30-in. pipe at various temperatures during a period of several weeks.

Research conducted by Battelle will involve subjecting pipe of various diameters to pressure normally used in transmitting natural gas over long distances. The pipe will be damaged purposely prior to the tests, permitting it to fracture under pressure. Speed with which cracks develop on various types of pipe will be measured by electronic timing devices.

C. F. de May, vice-president and chief engineer of the Columbia Gas System Service Corp., said that the results of the tests will be compiled to aid manufacturers and operators in improving the efficiency and safety of pipelines.

Nine new standards for cast iron pipe published

Twenty-seven years of experiment and research have resulted in nine American Standards for improving cast iron pipe.

The new standards provide uniformity in methods of determining the thickness and length of cast iron pipe, depending on the pipe's diameter and

"Engine Savers"

TWIN DISC MODEL CF TORQUE CONVERTER

"These Twin Disc Truck-Type Torque Converters are engine savers," says Bill Cross, garage foreman whose job it is to keep 30 Dart rear-dump 30-yard trucks moving millions of tons of overburden now . . . and copper ore later, at the huge open pit mine of the Anaconda Copper Mining Company at Weed Heights, Nevada.

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"When what they save in labor and parts on engines and driving units and brakes on one truck is multiplied by 30, like it is here, you've got a friend you don't want to part with," adds Cross.

Twin Disc Truck-Type Torque Converters save not only engines, but brakes, axles, transmissions, clutches — they keep engines operating in their most efficient range; start heavy loads smoothly; provide firmer traction; reduce shifting and pedal braking; prevent fatigue . . . promote operator efficiency.

Twin Disc Truck-Type Torque Converters are available for all heavy duty diesel truck engines, in two distinct types—Model CF for short, steep up-and-down runs, and Model DF with lock-out feature providing direct mechanical drive for long hauls with intermittent grades.

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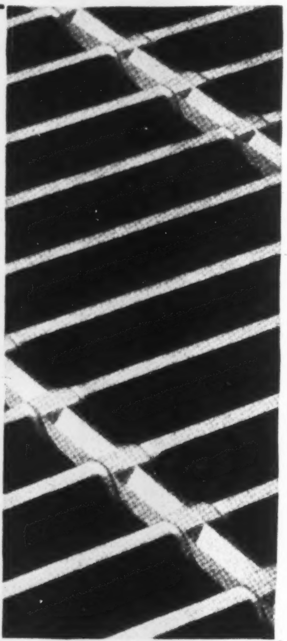
GARY

Welded Grating

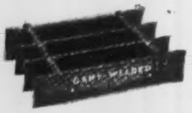
with Hexagonal Cross Bars



• This one-piece grating features design, construction, and appearance. The main bearing bars and the hexagonal cross bars are welded, insuring a durable unit. Our method of manufacture results in the tops of all bars being flush.

This particular design of welded grating is made with the main bars on 1-3/16" centers or .915 centers and the cross bars on 4" centers in panels 24" or 36" wide, and lengths to 40'-0".

Special gratings can be furnished with cross bars spaced on 1½"—2½" or 3" centers.



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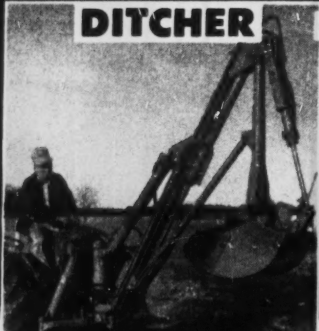
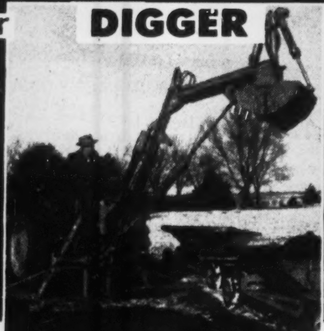
WHAT IS YOUR NEED...

DITCHER or DIGGER





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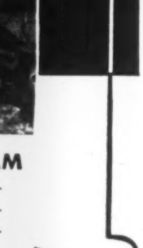
Designed for heavy and extensive digging. Works throughout 150° arc. High pressure hydraulic system enables all cylinders to operate simultaneously. Digs almost 11 feet deep, loads up to 8 feet 6 inches, reaches 14 feet.

SHAWNEE HYDRO-CLAM

The answer to heavy digging—digs straight down because hydraulic (4½ tons) pressure is applied to both halves of clam. Even bites through hard, frozen earth and tough black top. Loads up to 7½ feet.



Easily installed on Ford, Ford-Ferguson and Ferguson tractors.

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the pressure it must withstand. These specifications, dealing with both spun pipe and cast or molded pipe, also include data on reasons for failure of cast iron pipe and methods for preventing corrosion.

The standards were developed under American Standards Assn. Committee A 21, formed in 1926 to undertake this project. Committee chairman since that time has been Thomas H. Wiggin, consulting engineer.

Mr. Wiggin said, "Our committee has one important task remaining. That is to recommend dimensions, thicknesses and pressure ratings for fittings over a foot in diameter." This is the committee's present undertaking.

Copies of the standards may be obtained for a small sum from the American Standards Association, 70 East 45th St., New York, N. Y.

Lumber industry to spend $1 million on research

The lumber industry is about to launch a million-dollar research program designed to cut building costs and give consumers new and better lumber products. Major emphasis will be on lamination.

The research project under the direction of Timber Engineering Co. is the largest organized program of its kind in the history of the lumber industry and will involve a total outlay of $1,100,000 over a ten-year period. Financing will be done by individual lumbermen and lumber companies.

End products that the program is expected to develop include glued-up lumber panels faced with veneer, heavy-duty paper or thin fiberboard. Materials of this type will find uses in exterior wall and roof sheathing, sub-flooring and interior partitions and possibly studding and framing members.

Other objectives of the research program are to find new uses in building for small pieces and noncommercial wood species. Wide clear boards from narrow strips are one type of laminated building product that is expected to result from this effort.

It is also hoped that methods will be perfected for patching end-splits and other imperfections in wood to improve its performance and achieve a better utilization of waste material.

Further, investigations will be made to find an economical waterproof glue that sets at room temperatures and a low-cost preservative treatment that can be applied to wood before lamination.

The program will also aim to develop and perfect a technique for laminating different lumber species in the manner that metal manufacturers have developed the alloying of metals.

Examine blast effects on glazing materials

To find out what could be done to reduce the hazard of glass fragmentation in blast areas, the Atomic Energy Commission had scientists at Army Ordnance's Aberdeen Proving Ground test all forms of transparent window materials in a chamber that duplicates A-bomb blast pressures.

The report on the project concludes that plastic glazing materials are safest, but that some protection is afforded by applying a plastic coating to glass.

Ordnance scientists based their conclusions on tests involving various sizes and thicknesses of window glass, wire glass, safety glass, tempered glass, plastic coated glass and acrylic plastic sheeting. For each material they determined the maximum wave pressure at which there is no shattering, the minimum shattering shock wave pressure, the shatter pattern, size of fragments and the inertia of the fragments.

Included also is information on the test equipment and procedure used and also a comparative evaluation of the hazard from each of the materials tested.

The full report covers 37 mimeographed pages and is available from the Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. Price of Publication PB 111,111 is $1.00

Owens-Illinois to build new technical center

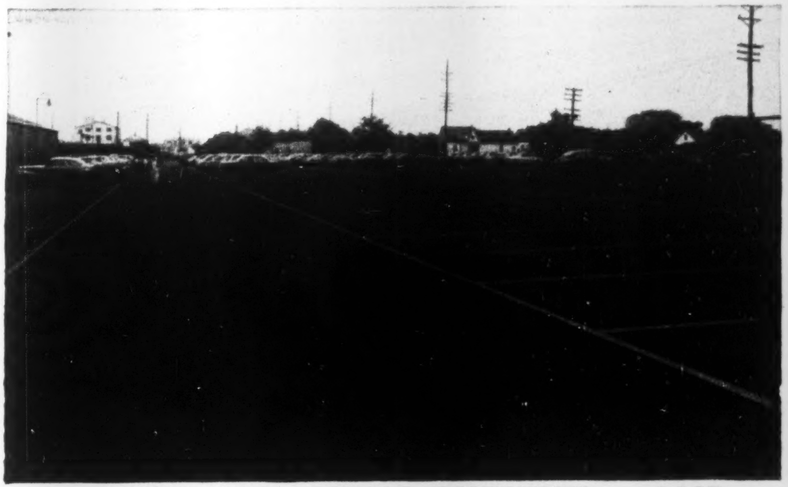
The Owens-Illinois Glass Co. has announced plans to build a new multi-million dollar technical center in Toledo, Ohio The center will make possible the consolidation of the company's general research program with the engineering activities of the various divisions.

Broadly, the aims of the Owens-Illinois general research and engineering program are to develop new methods of making and using glass while at the same time improving present processes and products.

The center, described as the most advanced in the glass industry, will be equipped to conduct research in every process, product and material known to the company's business. In addition, a company spokesman stated that it will be capable of carrying a project

JENNITE J-16®

Surface Seal



PARKING LOT ASPHALT PAVEMENTS — LAST LONGER WHEN SEALED WITH J-16 BECAUSE:

- J-16 protects such pavements from damage caused by concentrated oil and gasoline drippage.
- J-16 protects such pavements from the oxidizing and volatilizing action of the sun.
- J-16 stops water seepage which causes softening or failure of base.
- J-16 stops frost action which results in progressive ravelling of asphalt pavement surface.
- J-16 provides a long lasting attractive satin black, easy-to-clean wearing surface.

Protective maintenance pays

For complete details on Jennite J-16— Write for Specifications and these two brochures.

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WOOSTER · OHIO

CABLE ADDRESS "MINCO"

Contractor Ups Output 3000%

American Crawlers lift a "forest" in minutes for Griffith and Dyal, Florida wood contractors! It used to take a whole crew 10 hours to load a flatcar with pulpwood logs. Now, American 375 Cranes do the job in 20 minutes—30 times faster than before!

Timber trucks carrying 2¾ cords of pulpwood each are emptied in two easy lifts by one American Crawler. A second American 375 swings a huge concrete block whose flat side bumps the logs into place on the car.

Loading an average of 125 flatcars a week, American Crawlers play a vital part in boosting volume for the nearby St. Regis Paper Company at Jacksonville. The loading speed and power needed for this operation is typical of American Hoist equipment! Designed to speed work and cut costs, American products may be the answer to *your* production headaches. If your business is such that factual, on the job stories would be of interest to you, mail the coupon below and we will send you copies of the American Crosby Clipper regularly.

American Hoist
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Yes, I'd like to get the American CROSBY CLIPPER.
Also, send information on the following equipment:
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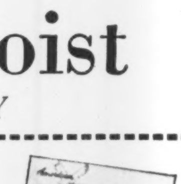


Send coupon today!

from the drafting board stage through the laboratory and pilot plant to tests under conditions encountered in commercial production.

Metal protecting films investigated by Navy

The Navy has embarked on an exhaustive study of metal protecting films to determine why these paint and plastic coatings work as they do.

During World War II, a large chemical corporation developed an excellent rust preventive. Now called a wash primer, it is used to protect metal on ships as a single coating or as an undercoat for other paints. When used as an undercoat, the surface lasts twice as long, but no one knows exactly why. The Brooklyn Polytechnic Institute and Rutgers University have joined the Navy to find out.

Grant funds for research on steel curtain walls

Princeton University's School of Architecture has received a grant from the Committee of Stainless Steel Producers, American Iron and Steel Institute, for basic research into stainless steel curtain wall design and construction.

ASI's stainless steel specialist Richard E. Paret, said that the research team plans to obtain data on such curtain wall details as proper thickness and conformation of stainless skins, kinds of insulation, methods of vapor transmission and control and efficient attachment to the building's structure.

Underwater breakwaters created by explosives

Preliminary research has been completed on the almost instantaneous creation of artificial harbor areas through the use of explosives.

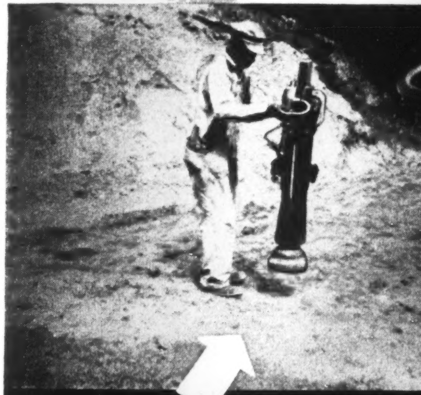
Work with a test basin and volcanoids (model explosion craters) indicates that the success of the underwater breakwaters is particularly dependent on the slope of the shore. Size and patterns of subsea craters will depend almost wholly on local conditions.

The research program was directed by V. D. Merkys of the University of Michigan and was supported jointly by the Horace H. Rackham School of Graduate Studies and the Engineering Research Institute of the University of Michigan.

Figure your costs with BARCO for the "low bid" on any job!

SOIL COMPACTION JOBS no longer need present problems. With Barco Rammers, progressive contractors throughout the Nation are finding that specifications calling for 95% to 97.5% compaction represent opportunities for profitable work. FOR THE LOW BID ON ANY JOB, FIGURE YOUR COSTS WITH BARCO!

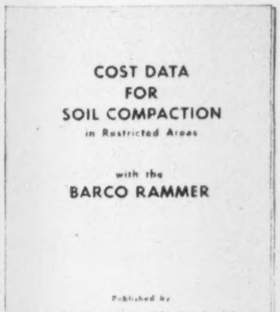
See for yourself; ask for a demonstration. *Worldwide Sales and Service.* BARCO MANUFACTURING COMPANY, 514L Hough Street, Barrington, Illinois. *In Canada:* The Holden Co., Ltd., Montreal, Canada.



AREA TAMPING—On high degree specified compaction with 12" to 20" lifts, the Barco Rammer will cover from 1 to 1½ square yards of surface per minute. This means 20 to 30 cu. yds. of fill per hour, or 160 to 240 cu. yds. per 8 hr. day, per Rammer.

TRENCH TAMPING—On trench back-fill, one Barco Rammer will tamp a trench 18" wide at the rate of 6 to 10 feet per minute or 360 to 600 feet per hour. Depending on soil conditions, lifts up to 24" may be used.

Write for this "COST DATA" Bulletin



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4 POINT PLAN
FOR LOW-COST CONCRETE WALL CONSTRUCTION

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(better method with real savings)

. . . includes strong, long-lasting panels that can be easily assembled to form walls of any height or shape; sturdy hardware and ties especially designed to speed erection and stripping. The combination insures a fine job completed in a surprisingly short time with real savings in labor and material costs.

2. ENGINEERING SERVICE

(blueprint of job with cost analysis)

. . . is set up to furnish you complete form layouts and job cost sheets on your form work—at no charge. You just send the plans, we do the rest. You'll be pleased with the clear picture of your job (its costs, bill of materials, and labor saving methods) that the Symons Engineering Service provides.

3. SALES SERVICE

(job demonstration of how-to-do-it)

. . . means regular on the job service. Symons fieldmen solve forming problems in three ways. First, by on-the-job recommendations of forms and hardware needed. Second, by showing your workmen how to set-up the forms efficiently. Third, by making special deliveries when last minute problems arise.

4. RENTAL-PURCHASE PLAN

(60 day try-out)

. . . offers you the opportunity to use the Symons Forming System on a rental basis . . . with all rental charges to apply on the purchase price, during a 60 day period.

Contractors throughout the country have tried the Symons 4-Point Plan and like it. Send in your request for the complete facts—no charge or obligation.

SYMONS CLAMP & MFG. CO.
4265 DIVERSEY AVENUE, CHICAGO 39, ILLINOIS

Please send information on Symons Forms.
(Enclosed are plans for form layouts and cost sheets.)

Name______________________________

Firm______________________________

Address______________________________

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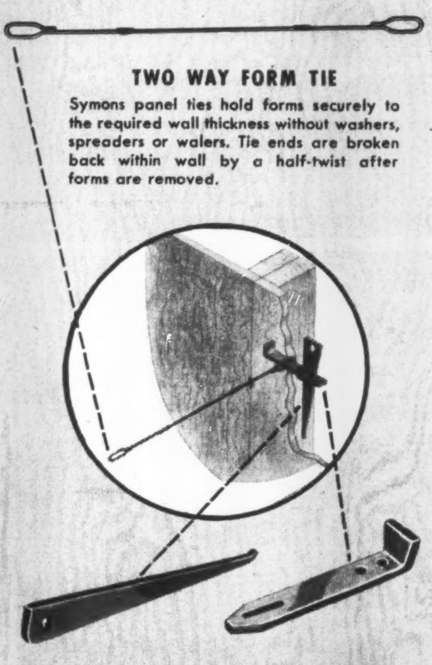
Symons Forms will cut forming costs and will do a better job. Symons Engineering and Symons Field Service will show you and your men how to do the job the easiest and cheapest way. The Symons Rental-Purchase plan allows you to try these forms before you buy.

This combination of better tools, instruction-in-their-use, and a try-out period, means more profits for you and more satisfaction for the owner.

Speed, in erection and stripping, which saves time and money, will in many cases pay for the forms on the first job. The many additional reuses mean extra profits for you.

Just 3 pieces



TWO WAY FORM TIE

Symons panel ties hold forms securely to the required wall thickness without washers, spreaders or walers. Tie ends are broken back within wall by a half-twist after forms are removed.

TIGHTENING WEDGE

Tightening wedge is inserted through the slot in the bolt and pulls form sides tightly together.

CONNECTING BOLT

Slotted connecting bolt passes through edges of adjacent forms and tie loop.

Dept. J-3

Symons CLAMP & MFG. CO

LeTourneau offers land clearing line

Diesel-electric power featured in new units

Having sold the earthmoving part of its business (ENR May 7, 1953), R. G. LeTourneau, Inc., has made its bow in the land clearing field with a new line of equipment.

Backbone of the line is a self-powered, mobile tree saw equipped with two extensible, maneuverable booms; a lower boom carries an electric-driven circular saw while an upper pusher boom directs the fall of the trees.

Also in the new line is the LC tractor equipped with a special land clearing blade and a Tree Stinger with a telescoping boom used to pull or push over otherwise inaccessible trees.

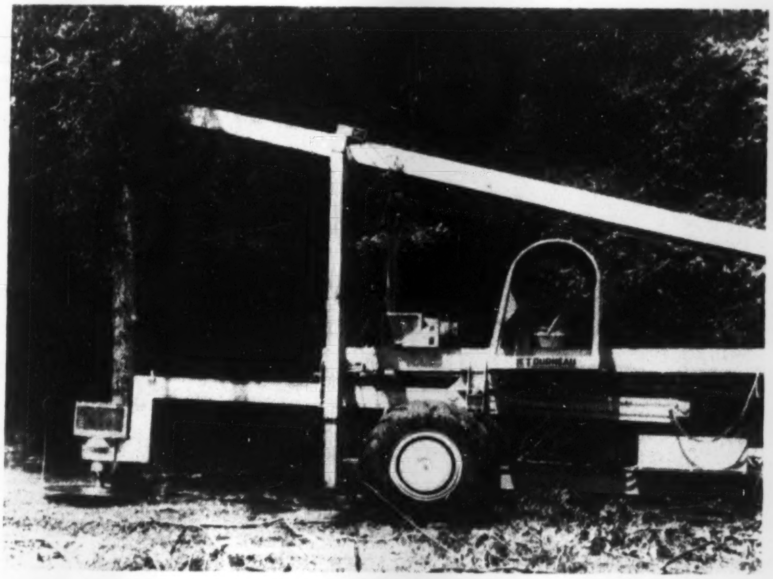
The mobile saw or Tournasaw, as it is called, is driven at a speed of 5 mph by individual electric motors in each of the four wheels. Spring-loaded brakes on each wheel's drive motor set automatically when current is off and are magnetically released when current is applied. Similarly, four-wheel electrical steering is standard on the unit. Two-wheel steering radius is 42½ ft; four-wheel steering radius is 23½ ft.

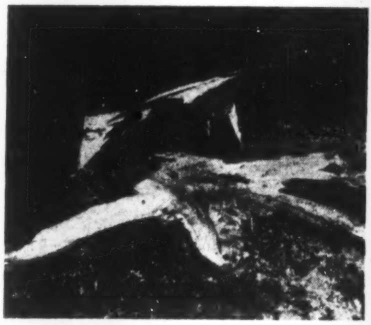
As with all other strategic points of power application, the lower boom on which the circular saw is located is also electrically controlled and may be extended 16 ft ahead of its retracted position. Scope of the boom in traverse movements depends, of course, on the amount of forward extension, but fully extended, the saw can be moved 10½ ft to left and right of center; retracted, the total movement is reduced to 14 ft.

Vertical placement range of the saw blade again depends upon the amount of boom extension. Boom retracted, vertical placement may vary from one foot below ground level to four above; boom extended, this placement varies from 18 in. below ground level to 6 ft. 2 in. above.

Controlled placement of the sawblade not only allows the operator to use several angles of approach on one tree but also to cover more than 250 sq ft without moving the machine. Further, trees may be sawed off very close to ground level.

The sawblade itself is electrically powered, turns at 720 rpm and meas-

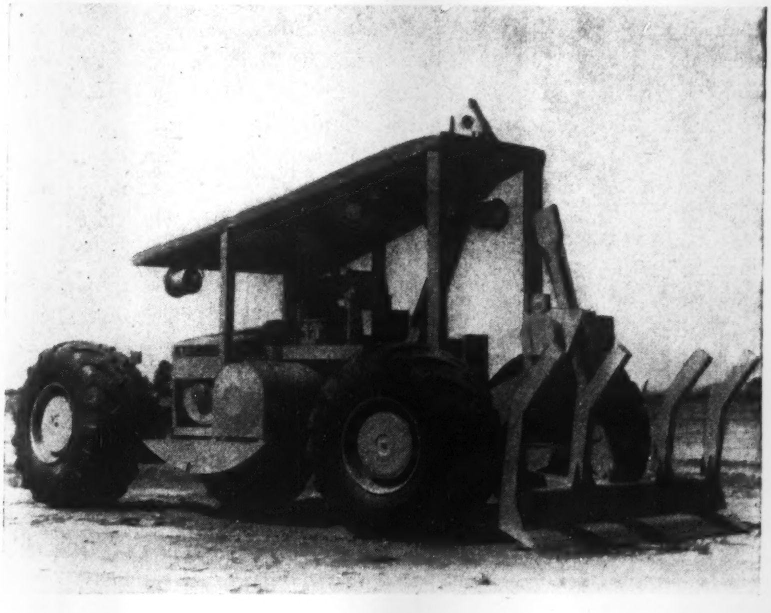




ABOVE, the booms of the Tournasaw mobile tree saw are maneuvered into position. The lower boom carries an electrically driven saw; the upper boom directs the fall.

LEFT, extremely low stump is result of saw boom's three dimensional maneuverability.

BELOW, LC tractor with special blade is used for brush cutting and compacting piles of fallen trees and brush. Like the Tournasaw, drive is diesel-electric.



DESIGNED IN CONCRETE—*to Resist Lateral Forces*

Wherever earthquakes, hurricanes or tornadoes are known to occur periodically it always has been necessary to design structures to resist these powerful lateral forces. Now, confronted with the possibility of atomic blasts, it has become even more necessary to incorporate resistance in structures to destructive lateral forces.

The most logical and economical way to do this is to use reinforced concrete frames, floors and walls. Such construction is inherently resistant to lateral forces because it is continuous and integrates all structural parts. This construction eliminates any need for special members to provide resistance to these forces and makes for marked economy in the cost of buildings exposed to strong lateral forces.

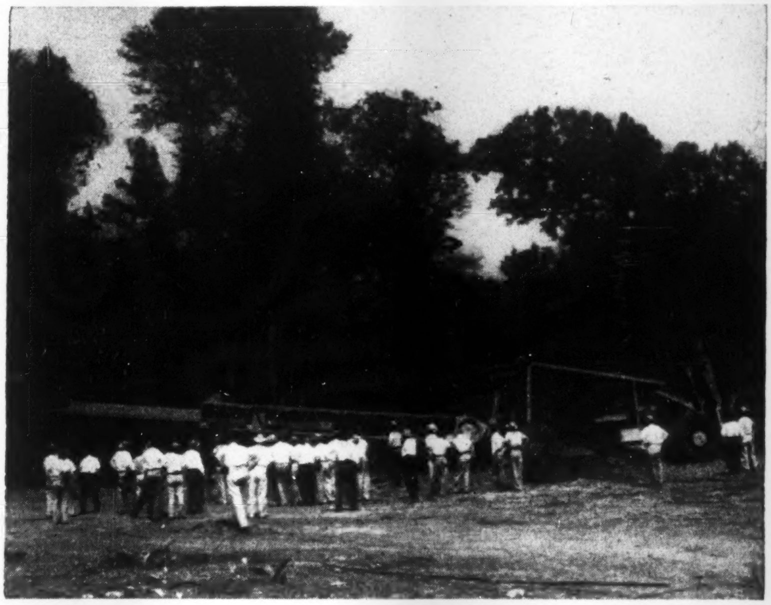
An excellent example of such design and construction is the apartment building shown above. It is the 10401 Wilshire Boulevard Building in Los Angeles, designed by Architect Martin Stern, Jr. R. R. Bradshaw was the structural engineer. Both are from Los Angeles. Inasmuch as Los Angeles building ordinances require provision for resistance to seismic forces reinforced concrete construction was a logical choice. In addition the use of concrete architecturally resulted in an attractive appearance and such important advantages as durability, firesafety, low maintenance expense and ***low annual cost.***

Write today for free, illustrated literature about architectural concrete and concrete frame and floor construction. Distributed only in U.S. and Canada.

PORTLAND CEMENT ASSOCIATION

DEPT. A10b-17, 33 WEST GRAND AVENUE, CHICAGO 10, ILLINOIS

A national organization to improve and extend the uses of portland cement and concrete through scientific research and engineering field work

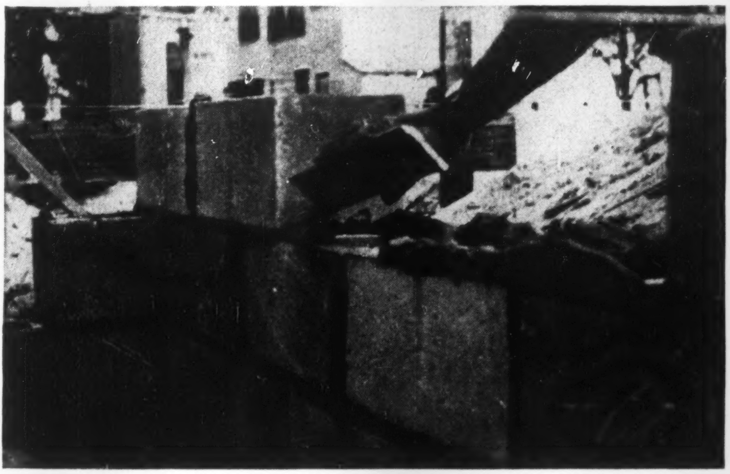


TREE STINGER features a 34-ft telescoping boom that can be extended to pull or push over trees inaccessible to other tree felling operations.

ures six feet across. It is said that sufficient power is developed by the driving motor to permit the sawing of seasoned hardwood stumps with ease.

• Tree fall directed—The overhead pusher boom is used to direct the fall of trees in parallel positions. Directional felling keeps the path ahead clear and makes decking and burning a simpler operation. The upper boom extends twenty feet beyond the front of the unit and may be swung twelve feet to the left and right of center. Area covered by the boom without moving the vehicle is about 380 sq. ft.

It is claimed that the unit's 20-in.



WALL VENTILATOR for concrete block structures fits into mortar joints as blocks are built up. One row of the vents, spaced at four-foot intervals, is inserted at slab level. A second row is installed, again at four-foot intervals but with centers staggered, just below the perimeter beams. This is said to force air circulation throughout the wall sections. Exterior portion of the vent is turned downward for rain protection. Moore Specialties, P. O. Box 506, W. Palm Beach, Fla.

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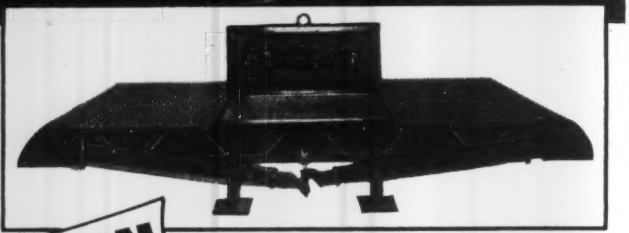

THURMAN PORTABLE TRUCK SCALE

Capacities: 20, 25 & 30 Ton Platform Lengths: 18, 22, 24 & 30 ft.

ACCURATE and PRECISE . . . for life! Yes, the Thurman Portable Truck Scale is engineered to take hard use. The solid steel deck is perfectly balanced and rests on cushioning bearings to absorb the shock of moving vehicles and protect vital parts. Chrome-plated weighbeam. All essential parts are electro-plated against corrosion.

SAVE THE COST of constructing expensive concrete pits everytime you move your scales to a new location. The Thurman Portable Truck Scale is pitless and can be ready for use, in minutes, on any flat terrain. Gravel or earth serves as a ramp. When moving, just remove 6 bolts which hold side arms in place. The complete scale can be then lifted as a unit and loaded onto a truck.

OTHER THURMAN SCALES

* Batching Scales
* Industrial Scales
* Liquid Weighing Scales
* Pipe Lever Hopper Scales
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* Pitless Scales
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* Wheelbarrow Scales

THURMAN
MACHINE CO.
(SCALE DIVISION)
156 N. 5th Street, Columbus, Ohio
Est. 1918 Dept. A

ground clearance, large diameter (73 in. o.d.), low pressure tires and four-wheel drive enable it to ride over fallen timber, ordinary stumps and small washes. In addition, the "oscillating" rear axle reportedly keeps weight distributed on all four wheels.

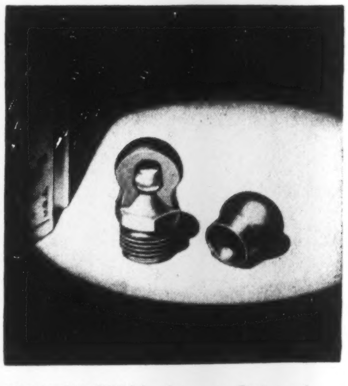
Overall length of the machine with saw boom retracted is 34 ft. 8 in. With the lower boom extended, the overall length is increased to 50 ft. The unit measures 14 ft. 11 in. wide, 23 ft high and has a wheelbase of 15 ft with a gage of 12 ft.

Power supply comes from a LeTourneau No. 3 ac generator driven by a GM 6-71 diesel engine. Price of the 46,000-lb Tournasaw without tires is about $40,800 f.o.b. Longview, Tex.

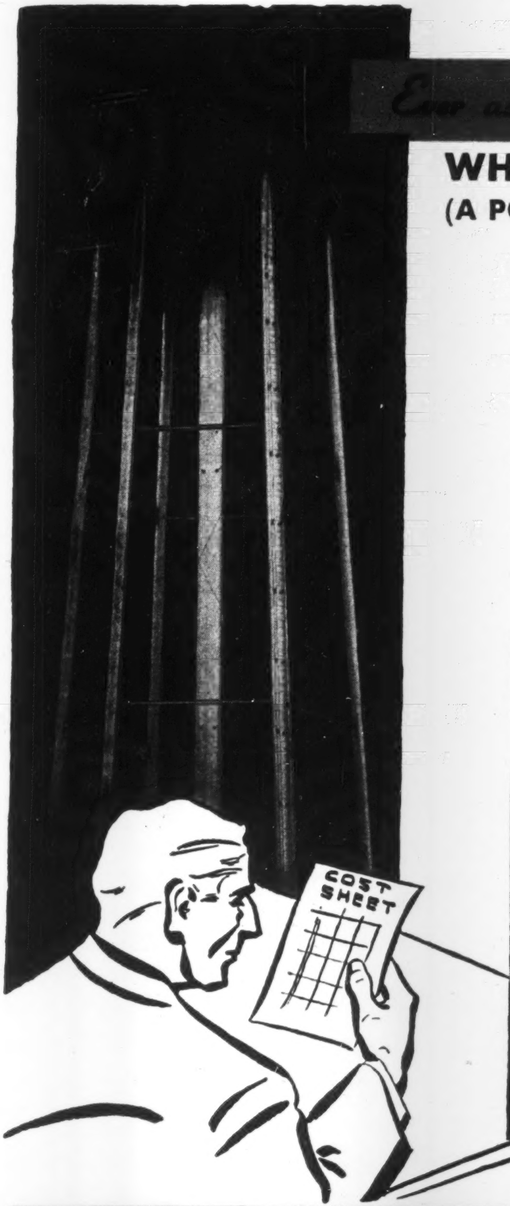
Like the Tournasaw, the LC tractor is diesel-electric driven throughout with the same type of individual wheel drive, electric steering, electromagnetic braking action and even the same four-wheel steer turning radius of 23½ ft. Power source is also the same make and model.

With one blade, the LC measures 25 ft. 8 in. in length, 10 ft. 10 in. in width and 14 ft. 4 in. in height. Wheelbase is 15 ft., gage is 8½ ft. Weight is about 35,635 lbs.

- **Land clearing blades**—Special land-clearing blades may be mounted to



PROTECTION of grease fittings from dirt and other abrasives is offered by Zur-Caps. Designed for use on all equipment using Zerk- or Alemite-type fittings, the oil-resistant neoprene caps snap on and off and are said to save the time usually required to clean fittings before each lubrication. Most important however is the reported elimination of wear from dirt forced into the fittings with each application of new grease. Winner Mfg. Co., Box 945, Fort Wayne 1, Ind.



Ever ask your TREASURER . . .

WHAT *HE* THINKS OF YOUR TANKS?

(A POSEY IRON Bid Might Interest Him and YOU)

Most treasurers are apt to put cost first. And cost is certainly *not* the only factor to consider when buying steel plate construction.

But—

It's good engineering as well as good financial policy to refuse to pay a penny more for tanks . . . or pressure vessels . . . or stacks . . . than is necessary fully to meet *the standard desired.*

The Posey Iron Works offers you 42 years of money-saving experience over the full range of steel plate fabrication . . . *practical* engineering and design service that concentrates on structural integrity and safety rather than on cost-padding "frills".

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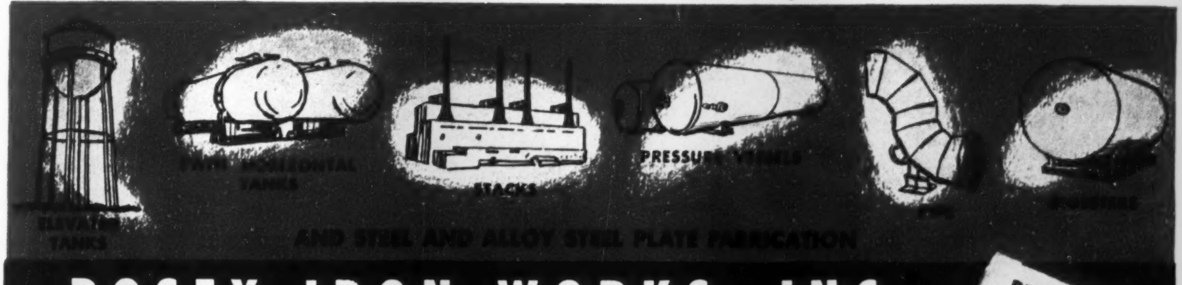
Perhaps more than any other production step, welding influences tank costs and structural soundness. Every electric welder in Posey's shops is fully qualified. No plate is welded without proper preparation of edges . . . electrodes are chosen after careful consideration of requirements.

Posey meets all standard codes including ASME; API-ASME; API. Consultation does not obligate you.

Posey Iron Works self-supporting stacks installed at the Niagara Falls Plant of the International Graphite & Electrode Division of Speer Carbon Co. Height: 50 ft. Diameter: 3 ft.



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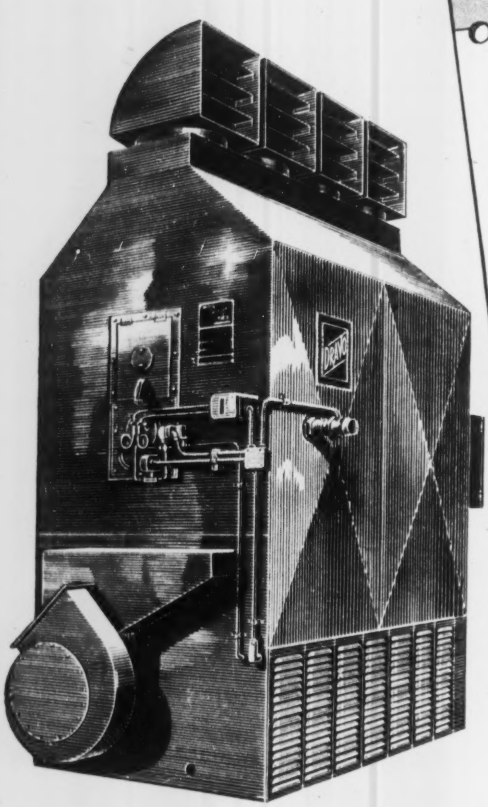
Facts ON HOW YOU CAN SAVE..

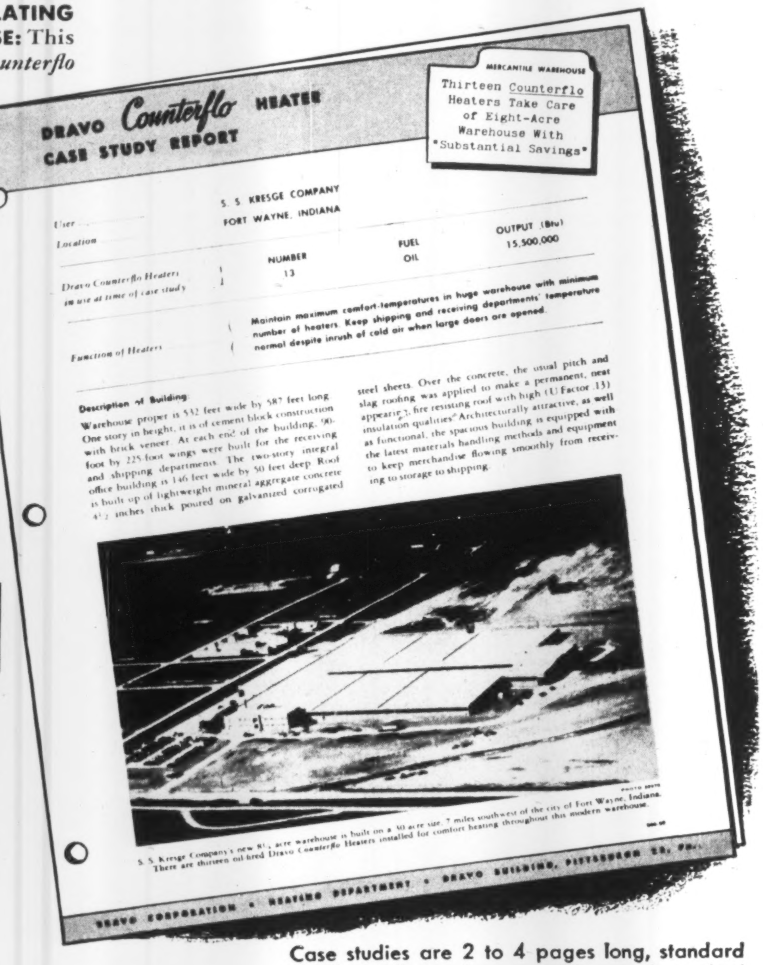
IN THESE *FREE* CASE STUDIES OF ACTUAL INSTALLATIONS...

Complete information—names, diagrams and photographs, along with the results obtained by using Dravo Heaters—is provided in detailed case studies. These studies, covering a wide variety of heating problems in many types of industrial buildings, show how these users saved substantially with Dravo *Counterflo* Heaters. If you buy, specify or recommend space heating equipment, these case studies will be of value to you.

FOR EXAMPLE...

COMPLETE HEATING AND VENTILATING FOR AN EIGHT-ACRE WAREHOUSE: This case study tells how 13 Dravo *Counterflo* Space Heaters saved S. S. Kresge Company the cost of installing an expensive steam-heating system in this huge warehouse . . . how at this modern warehouse the Dravo *Counterflo* Heater recirculation system keeps the roof heat losses to a minimum resulting in fuel savings. Here is one example of the many cost saving features reported in this case study. To get your free copy, or other case studies send in the attached coupon.





DRAVO *Counterflo* HEATER CASE STUDY REPORT

MERCANTILE WAREHOUSE

Thirteen Counterflo Heaters Take Care of Eight-Acre Warehouse With "Substantial Savings"

User S. S. KRESGE COMPANY
Location FORT WAYNE, INDIANA

	NUMBER	FUEL	OUTPUT (Btu)
Dravo Counterflo Heaters in use at time of case study	13	OIL	15,500,000

Function of Heaters: Maintain maximum comfort-temperatures in huge warehouse with minimum number of heaters. Keep shipping and receiving departments' temperature normal despite inrush of cold air when large doors are opened.

Description of Building:

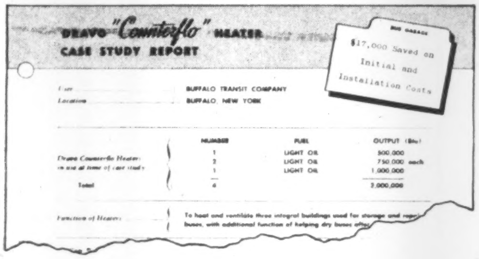
Warehouse proper is 532 feet wide by 587 feet long. One story in height, it is of cement block construction with brick veneer. At each end of the building, 90-foot by 225-foot wings were built for the receiving and shipping departments. The two-story integral office building is 146 feet wide by 50 feet deep. Roof is built up of lightweight mineral aggregate concrete 4½ inches thick poured on galvanized corrugated steel sheets. Over the concrete, the usual pitch and slag roofing was applied to make a permanent, neat appearing, fire resisting roof with high (U Factor .13) insulation qualities. Architecturally attractive, as well as functional, the spacious building is equipped with the latest materials handling methods and equipment to keep merchandise flowing smoothly from receiving to storage to shipping.

S. S. Kresge Company's new 8½ acre warehouse is built on a 30 acre site, 7 miles southwest of the city of Fort Wayne, Indiana. There are thirteen oil-fired Dravo *Counterflo* Heaters installed for comfort heating throughout this modern warehouse.

DRAVO CORPORATION • HEATING DEPARTMENT • DRAVO BUILDING, PITTSBURGH 22, PA.

Case studies are 2 to 4 pages long, standard 8½" x 11" size for easy filing, and punched for 3-ring binder.

. . WITH DRAVO *Counterflo* HEATERS



DRAVO "Counterflo" HEATER
CASE STUDY REPORT

BUS GARAGE

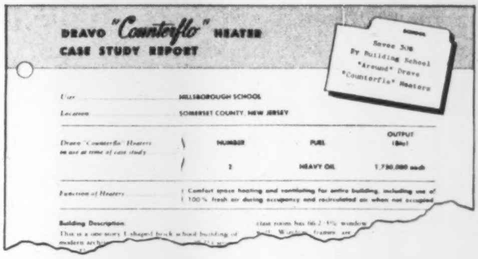
$17,000 Saved on Initial and Installation Costs

User: BUFFALO TRANSIT COMPANY
Location: BUFFALO, NEW YORK

Drave Counterflo Heaters in use at time of case study	NUMBER	FUEL	OUTPUT (Btu)
	1	LIGHT OIL	500,000
	2	LIGHT OIL	750,000 each
	1	LIGHT OIL	1,000,000
Total	4		3,000,000

Function of Heaters: To heat and ventilate three integral buildings used for storage and repair buses, with additional function of helping dry buses after

COMFORT HEATING LARGE BUILDING AREAS: Garages, diesel repair shops, auditoriums, etc., with large open spaces are heated comfortably and easily . . . Dravo Heaters provide quick, automatically controlled, low-cost heating.



DRAVO "Counterflo" HEATER
CASE STUDY REPORT

SCHOOL

Saves 3/8 By Building School "Around" Dravo "Counterflo" Heaters

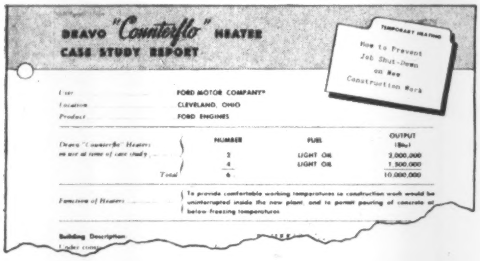
User: HILLSBOROUGH SCHOOL
Location: SOMERSET COUNTY, NEW JERSEY

Dravo "Counterflo" Heaters in use at time of case study	NUMBER	FUEL	OUTPUT (Btu)
	2	HEAVY OIL	1,750,000 each

Function of Heaters: Comfort space heating and ventilating for entire building, including use of 100% fresh air during occupancy and recirculated air when not occupied

Building Description:
This is a one-story L-shaped brick school building of modern archi
class room has 66 2/3% window wall. Window frames are

COMFORT HEATING AND VENTILATION FOR ENTIRE BUILDINGS: Initial cost of Dravo Heater installation was 30% less than a "wet type" system for this 25-room school. Thermostatic controls in each room provide uniform comfort heating.



DRAVO "Counterflo" HEATER
CASE STUDY REPORT

TEMPORARY HEATING

How to Prevent Job Shut-Down on New Construction Work

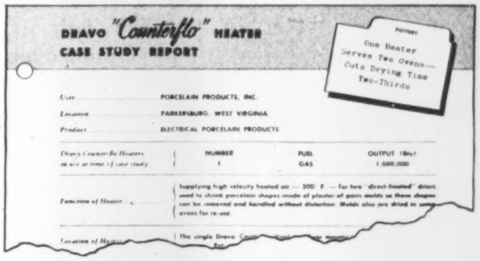
User: FORD MOTOR COMPANY*
Location: CLEVELAND, OHIO
Product: FORD ENGINES

Dravo "Counterflo" Heaters in use at time of case study	NUMBER	FUEL	OUTPUT (Btu)
	2	LIGHT OIL	2,000,000
	4	LIGHT OIL	1,500,000
Total	6		10,000,000

Function of Heaters: To provide comfortable working temperatures so construction work would be uninterrupted inside the new plant, and to permit pouring of concrete at below freezing temperatures

Building Description:
Under cons

TEMPORARY HEATING: Dravo Heaters provide comfort heating and increase worker-efficiency during building construction and can keep ground temperature above freezing for pouring and setting concrete floors during cold weather.



DRAVO "Counterflo" HEATER
CASE STUDY REPORT

POTTERY

One Heater Serves Two Ovens— Cuts Drying Time Two-Thirds

User: PORCELAIN PRODUCTS, INC.
Location: PARKERSBURG, WEST VIRGINIA
Product: ELECTRICAL PORCELAIN PRODUCTS

Dravo Counterflo Heaters in use at time of case study	NUMBER	FUEL	OUTPUT (Btu)
	1	GAS	1,000,000

Function of Heater: Supplying high velocity heated air — 200° F — for two "direct-heated" driers used to shrink porcelain shapes inside of plaster of paris molds so these shapes can be removed and handled without distortion. Molds also are dried in same ovens for re-use

Location of Heater: The single Dravo Count

PROCESS DRYING AND HEAT CURING: Drying time was cut 66% at this porcelain products plant. Dravo Heaters have cut processing time in industrial production of plastic, wood, rubber, paper, fibre and ceramic products.

DRAVO HEATERS OFFER YOU:

- **LOW INITIAL COST**—Users report 30% to 60% savings over "wet-type" systems.
- **EASY INSTALLATION**—Need only fuel, exhaust and electrical connections . . . no ductwork.
- **LOW OPERATING COST**—Direct-fired . . . burn gas or oil . . . readily converted . . . minimum efficiency 80%.
- **AUTOMATIC OPERATION**—on-off or modulating controls . . . no constant attention required.
- **LONG SERVICE LIFE, LOW MAINTENANCE**—Stainless steel combustion chamber eliminates refractory lining.
- **SAFETY**—Approved by ~~American Gas Association,~~ listed by Underwriters' Laboratories, Inc.; Dravo standardized safety control circuit accepted by Factory Mutual Engineering Division.
- **MOBILITY**—Can be moved to any location.
- **FLEXIBILITY**—When floor space is limited, can be wall-hung or suspended from trusses in any position.

"CASE STUDIES INVALUABLE," writes a Heating Engineer. "They are informative and highly useful to me."

Send this Coupon Today!

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Sales Representatives in Principal Cities

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3

Dravo Corporation, Heating Department
Dravo Building, Fifth and Liberty Avenues
Pittsburgh 22, Pennsylvania

Send me free case studies for the subjects I've checked, and Dravo Heater Catalog AB-523-0213.

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- ☐ Stores, schools and auditoriums.
- ☐ Process drying and heat curing.
- ☐ Tempering make-up air.
- ☐ Temporary heating.
- ☐ For use in conjunction with air conditioning.
- ☐ Please have a representative call at no obligation to me.

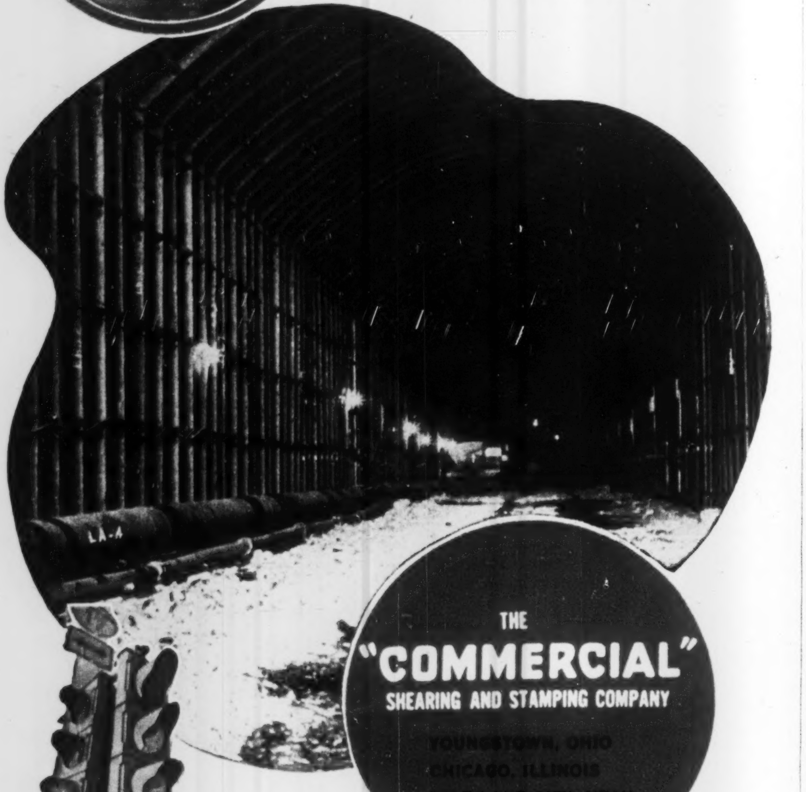
Name ______________________ Title ______________________
Company ______________________ Address ______________________
City ______________________ Zone ______ State ______________________

HOLE THRU FASTER WITH "COMMERCIAL" STEEL TUNNEL SUPPORTS

Full face headings in many hard ground tunnels can only be maintained when tunnel supports can be set quickly after the mucking operation. "Commercial" steel supports are completely fabricated and as they go into the tunnel portal you may be sure that they will fit, will erect into place quickly and only need field bolting by less skilled labor.

Steel provides the most economical and by all odds the safest ground support. Use "Commercial" steel supports, designed and produced by men who have had the greatest experience, are recognized specialists and whose product was used with such outstanding results in tunnels on the Pennsylvania Turnpike.

ALLEGHENY MOUNTAIN
TURN ON LIGHTS



THE "COMMERCIAL" SHEARING AND STAMPING COMPANY
YOUNGSTOWN, OHIO
CHICAGO, ILLINOIS
SALT LAKE CITY, UTAH

INADEQUATE SUPPORTS MAY... STOP YOUR TUNNEL JOB.

either or both the front and rear of the tractor to assist in decking operations, where fallen trees are placed in compact rows for burning, and also for pioneering and clearing of brush and saplings. The blades are designed with a pressure bar at the top that puts tension on small trees to permit the cutting edge at the bottom of the blade to shear them off cleanly.

The special blades are 11 ft. 3 in. wide, and 4 ft. in height. Mounting methods allow the blade to be lifted 3½ ft. above the ground or lowered with down pressure 18 in. below the ground line. Weight of the blade is about 2,410 lbs.

The Tree Stinger features a 34-ft. telescoping boom that will extend an additional 19 ft. to reach out over streams, sloughs or steep banks and pull or push over trees not normally accessible to mechanized saws.

Since all of the units feature diesel-electric drive, they may all be equipped with floodlights. R. G. LeTourneau, Inc., Longview, Tex.

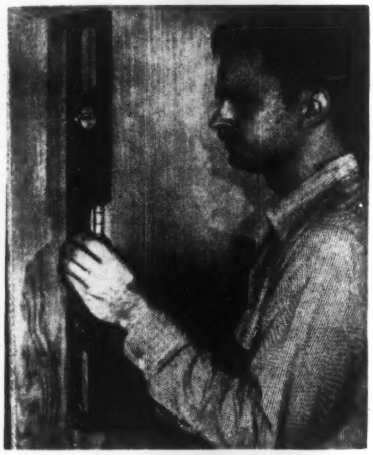
Lightweight plastic levels are guaranteed unbreakable

Ruggedness, a prime essential in construction tools, is guaranteed for a new 24-in. plastic level—the shatterproof guarantee offers free replacement if the level is broken in normal use.

Lucite sheaths enclose the level bubbles not only for protection but for magnification as well. Further, it is reported that instead of obscuring the bubbles as metal guards do, the lucite guards concentrate the light and make the level easier to read.

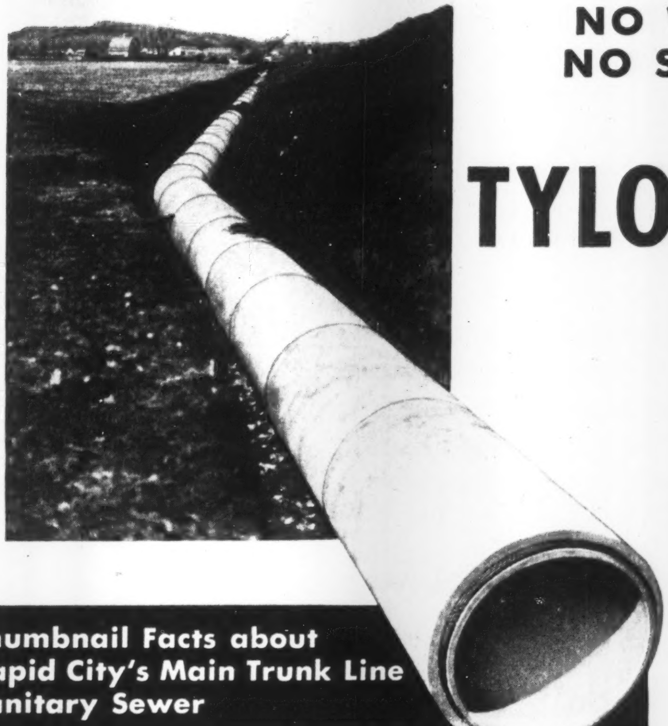
The 12-oz level is also corrosion resistant and a non-conductor. Creative Plastics Corp., Stony Brook, Long Island, N. Y.

(*New Products continued on p. 267*)



IN THE NEW

Rapid City Sewer Line



NO WATER LEAKS
NO SEWAGE SEEPS

Through

TYLOX *flexible rubber* JOINTS

Speed was the keynote — tight joints a "must" — on the new sewer line for Rapid City, S. D. And, both were achieved with TYLOX, the easily installed flexible rubber joint that makes lines leakproof for life!

By combining 6′ lengths of reinforced concrete pipe with TYLOX gaskets, the contractors got permanently tight joints in jig time — and, at a "savings of many thousands of dollars to the city." Almost five miles of pipe, ranging from 18″ bore up to 33″ bore, were laid quickly and easily, despite a partially "wet ditch" that resulted from the grade line being below ground water level.

Best of all, the TYLOX gaskets — snapped on the pipe at the job site — assure a permanently tight line. No water can get in — no sewage can get out. The engineers can be certain they'll be treating sewage — not infiltrated water—at their disposal plant.

Why don't you be sure of no leakage and no infiltration, on your next pipeline project by using the right joint, the tight joint — the TYLOX joint?

Thumbnail Facts about Rapid City's Main Trunk Line Sanitary Sewer

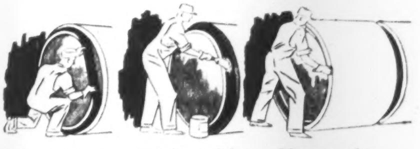
City Manager: H. H. Babcock
City Engineer: Claude Bangs **Consulting Engineer:** Julian Staven

PIPE: "Cretex" reinforced concrete pipe (ASTM—C75-41) in 6′ lengths. Supplied by South Dakota Concrete Products Co., Watertown, S. D.

Project No. 1:	4500 lineal feet — 33″	bore, T and G
	800 lineal feet — 24″	bore, T and G
	800 lineal feet — 18″	bore, T and G
Project No. 2:	6094 lineal feet — 33″	bore, T and G
	473 lineal feet — 30″	bore, T and G
	1017 lineal feet — 27″	bore, T and G
	4696 lineal feet — 24″	bore, T and G
	3301 lineal feet — 21″	bore, T and G
	1496 lineal feet — 18″	bore, T and G

CONTRACTORS:
Project No. 1: Trowbridge-Oehring Construction Co., Columbus, Nebraska
Project No. 2: The Northwestern Engineering Co., Rapid City, S. D. and Denver, Colorado

Making Joints with TYLOX RUBBER GASKETS
Is as simple as ABC



Cement tongue and snap on Tylox gasket.

Lubricate sliding surfaces with Tylox Cement.

Shove the pipe home.

[redacted]

1696

"THE ONLY PERMANENTLY TIGHT LINES ARE LAID WITH RUBBER JOINTS"

McIntosh's Buffalo-Springfield rollers compact a smooth sub-base for the Atlanta Truck Route running from the River Bridge to Marietta St.—a 4-lane, 52-ft. wide super-highway, with paving 10½" thick. Right: O. C. McCURLEY.

"Wouldn't Swap My Buffalo-Springfield Rollers for any other roller made"

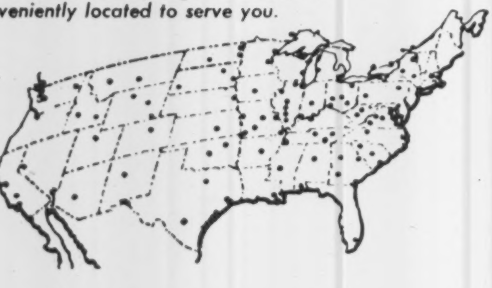
O. C. McCurley, Sup't. for McIntosh Paving Co., of Atlanta, knows the paving business, and the machines that do the paving. The asphalt paving business is his career.

Yancey Brothers Co., Distributor in Atlanta and Augusta, Ga., asked him what he thinks of the three Buffalo-Springfield Rollers he's using on this job. Here's his answer:

"I wouldn't swap my Buffalo-Springfield Rollers for any others on the market today. They are far ahead of any other rollers built. I know, because I have tried them all."

The rollers he speaks of are veterans of years of hard work, and miles of paving. The oldest one on the Atlanta Truck Route job is a three-wheel 1930 model, and the newest one was bought in 1948. The other tandem roller on the job is a 1937 model. All three have been used hard since McIntosh bought them, and they are all giving trouble-free service on this job, rolling 25,000 tons of stone base.

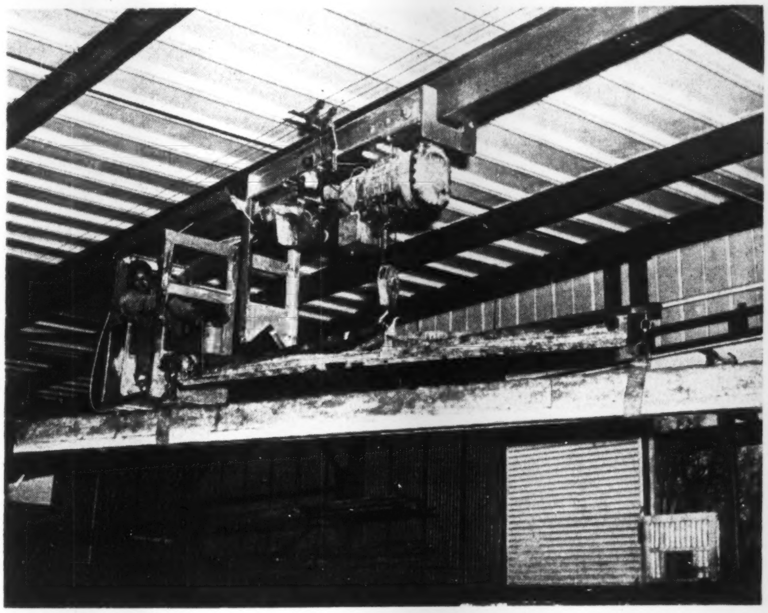
There's a Buffalo-Springfield Distributor conveniently located to serve you.



Put Buffalo-Springfield Rollers on your next paving job!

WORLD'S LARGEST EXCLUSIVE MANUFACTURER OF ROAD ROLLERS

BUFFALO SPRINGFIELD
THE STANDARD OF COMPARISON
SPRINGFIELD, OHIO

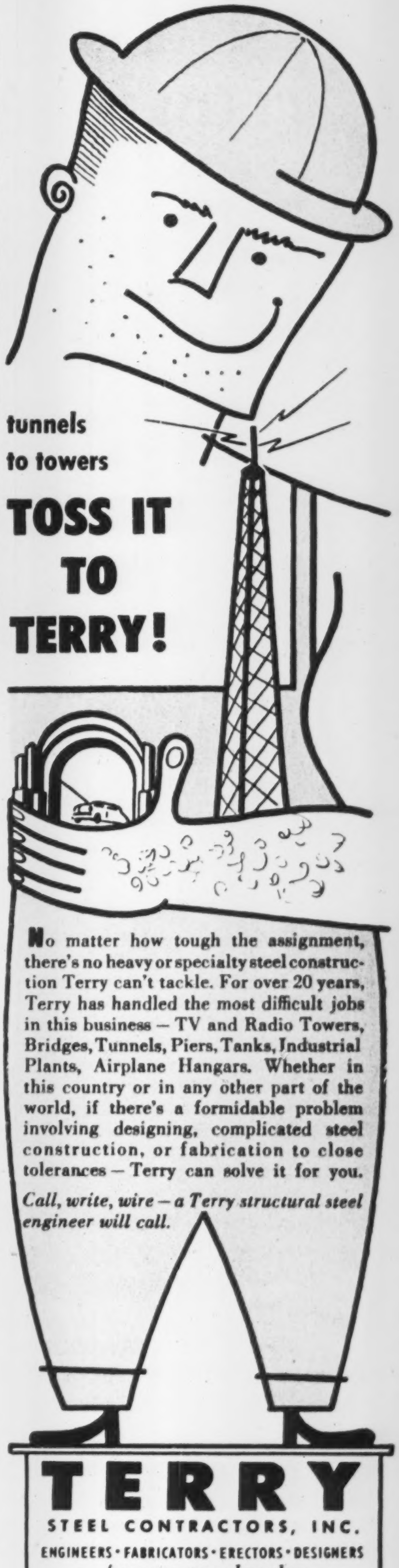


Wire mesh slings reduce damaging

A North Carolina stone company has been saving money with wire mesh slings. The usual slinging methods chipped and scarred the company's products, but the woven wire belts, by distributing the load over a wider surface, eliminated much of the damage. Similar savings might also be realized in the construction field where it is necessary to handle precast concrete shapes, insulated pipes or steelwork.

The body of the sling consists of lengths of spiraled wire joined together to form a mesh. The length of the sling depends on the number

A SINGLE POWER UNIT supplies hydraulic oil pressure through a manifold to power both the crawler and the various movements of the Gradall upper structure. The crawler mounting, new to Gradall units, offers two speeds of 1 and ½ mph. The controls for the boom are also used through a foot-operated diversion valve for forward and reverse motion of the undercarriage. Only one additional lever is added to the machines usual controls. Crawler sections are 10 ft long with 16-in. treads; wider treads are available on order. Minimum clearance is 11½ in. Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio.



tunnels
to towers

TOSS IT TO TERRY!

No matter how tough the assignment, there's no heavy or specialty steel construction Terry can't tackle. For over 20 years, Terry has handled the most difficult jobs in this business — TV and Radio Towers, Bridges, Tunnels, Piers, Tanks, Industrial Plants, Airplane Hangars. Whether in this country or in any other part of the world, if there's a formidable problem involving designing, complicated steel construction, or fabrication to close tolerances — Terry can solve it for you.

Call, write, wire — a Terry structural steel engineer will call.

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ENGINEERS • FABRICATORS • ERECTORS • DESIGNERS
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Sales & Executive Offices:
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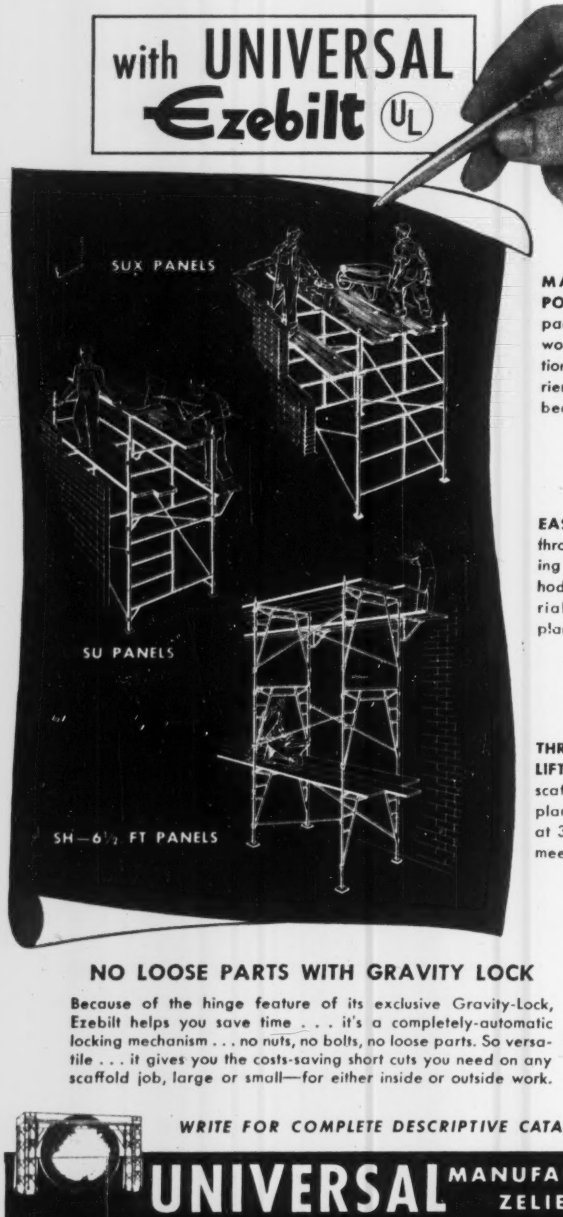
on any mason application

IT'S EASY TO PLAN SCAFFOLDING

SHORT CUTS

for______LESS WORK
LESS TIME
LESS COST

with UNIVERSAL
Ezebilt (UL)



MASON WORKS AT BEST POSITION—with Ezebilt SUX panels. Using brackets increases working area and allows additional passageway for hod carriers & wheelbarrows. 3 plank-bearing levels built in.

EASY TO THREAD PLANKS—through Ezebilt SU panels. Affixing brackets on outside allows hod carrier to dump his materials at convenient levels. 4 plank-bearing levels usable.

THRU WALKWAY AT EVERY LIFT—using 6½-ft panels, you scaffold up faster with less main plank moves. Brackets can rest at 3'3", 4½-ft or 6-ft levels, to meet local practice.

NO LOOSE PARTS WITH GRAVITY LOCK

Because of the hinge feature of its exclusive Gravity-Lock, Ezebilt helps you save time . . . it's a completely-automatic locking mechanism . . . no nuts, no bolts, no loose parts. So versatile . . . it gives you the costs-saving short cuts you need on any scaffold job, large or small—for either inside or outside work.

WRITE FOR COMPLETE DESCRIPTIVE CATALOG E-10

UNIVERSAL MANUFACTURING CORP.
ZELIENOPLE, PA.

World's Largest Producer of Steel Panel Scaffolding

Distributors offer planning help and fast deliveries from sales and rental stocks—See your phone directory

of wire spirals and the width depends on the length of the wire spirals. The sling can, therefore, be manufactured in any width and length.

Because the spirals hinge across the width of the sling, it can bend completely around loads of small radius. This construction is also said to minimize the crushing effect of the sling's grip around the load.

The slings are provided with heat-treated steel handles attached to each end. These are of different sizes so that one can fit through the other to provide a choke hitch around a load. This is recommended for maximum grip; a basket hitch (both handles on the hook) is recommended for maximum strength.

Besides the sling's delicate touch, another advantage in its flexibility is pointed out. The hinged action precludes permanent kinks where the sling bends around sharp edges, and also reduces the danger of the sling being cut by sharp-edged loads.

The combination of flexibility and strength is said to give the slings long life, but, like any other tool, they will wear out in time. However, broken wires can be readily seen, and sudden failure is therefore largely eliminated. Further, the slack that results from broken wires is said to be absorbed by the body of the sling so that strength is maintained even after several wires are broken.

The slings are available in a wide variety of steel alloys and can be specially designed to meet individual requirements. In addition, for applications requiring extreme care in handling, the slings can be fitted with rubber covers. CAMBRIDGE WIRE CLOTH CO., CAMBRIDGE, MD.

Colors by the gross with new masonry paint

Colorsol, a new masonry paint is produced in 12 standard colors and seven colorants in tubes. Combinations plus toners will produce 144 colors.

The paint is alkali-resistant and is said to retain the selected color under the most extreme weather conditions. Rates of coverage for the coating depend on the porosity of the surface and method of application, but Colorsol is said to coat from 250 to 500 sq. ft. per gal. and may be used to cover stucco, brick, concrete and construction block or weather asbestos shingles.

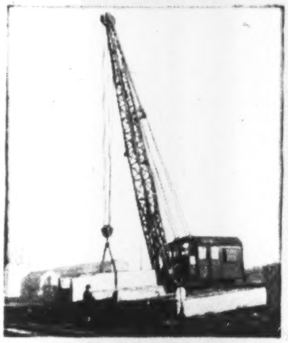
Color chip samples are available to architects and painting contractors. MARTIN-SENOUR CO., 2520 QUARRY ST., CHICAGO, ILL.

(*New Products continued on p.* 271)

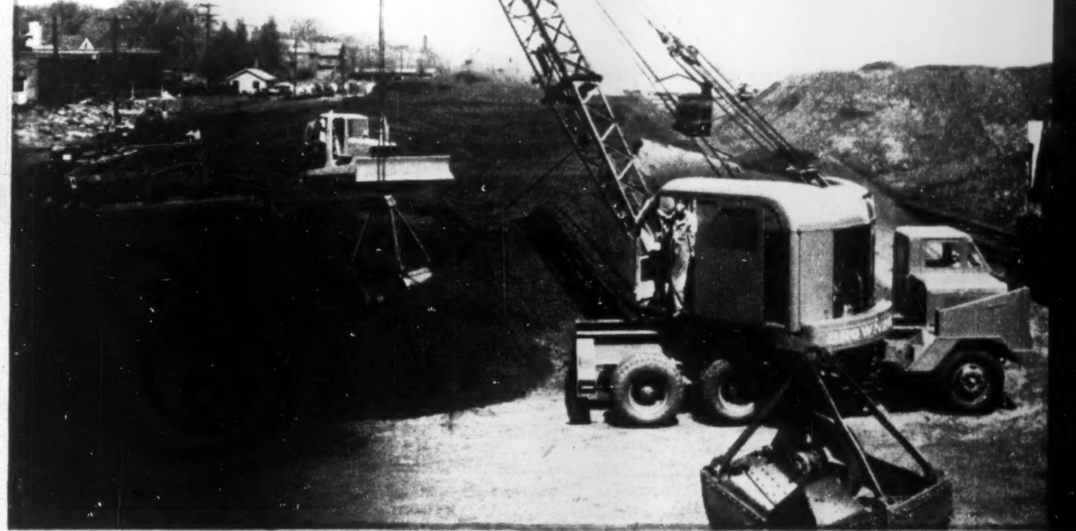
There's a BROWNING CRANE *Designed for Your job!*

BROWNINGS are Star Performers on these jobs

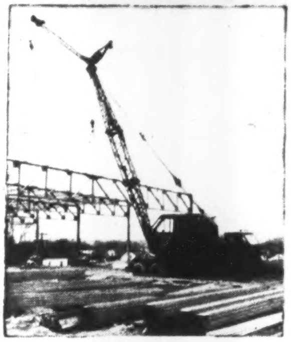
CAR LOADING



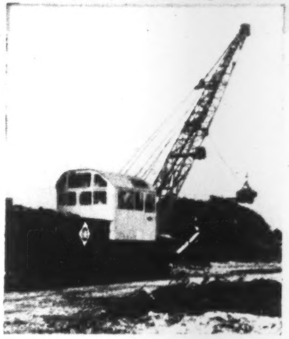
MAINTENANCE-OF-WAY WORK



High-speed maneuverability and fast, easy operation give this Browning 17½-Ton, Rubber-mounted Truck Crane a high production record on highway jobs. With a simple boom change it is equally versatile on back-hoe or shovel operations.



STEEL ERECTING



SCRAP HANDLING & SWITCHING

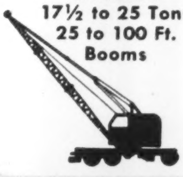
TEN basic models for heavy-materials handling with almost unlimited combinations of capacities, booms and equipment enable Browning to deliver a crane exactly suited to your needs. This wide selection assures you the right type of crane with ample power and capacity for your job. It also eliminates the necessity of over-investment in a crane larger than you need.

Brownings are the star performers of the power-crane industry . . . that's why crane men everywhere will tell you *"You can't go wrong with a Browning on the job."*

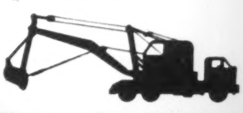
Write for complete specifications on the Browning model designed for your job.

THE BROWNING CRANE & SHOVEL CO.
Dept. B • 16226 Waterloo Road • Cleveland 10, Ohio

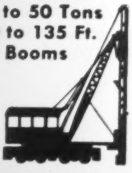
WAGON CRANES
2 Models
17½ to 25 Tons
25 to 100 Ft. Booms



TRUCK CRANES
5 Models
8 to 30 Tons
25 to 120 Ft. Booms



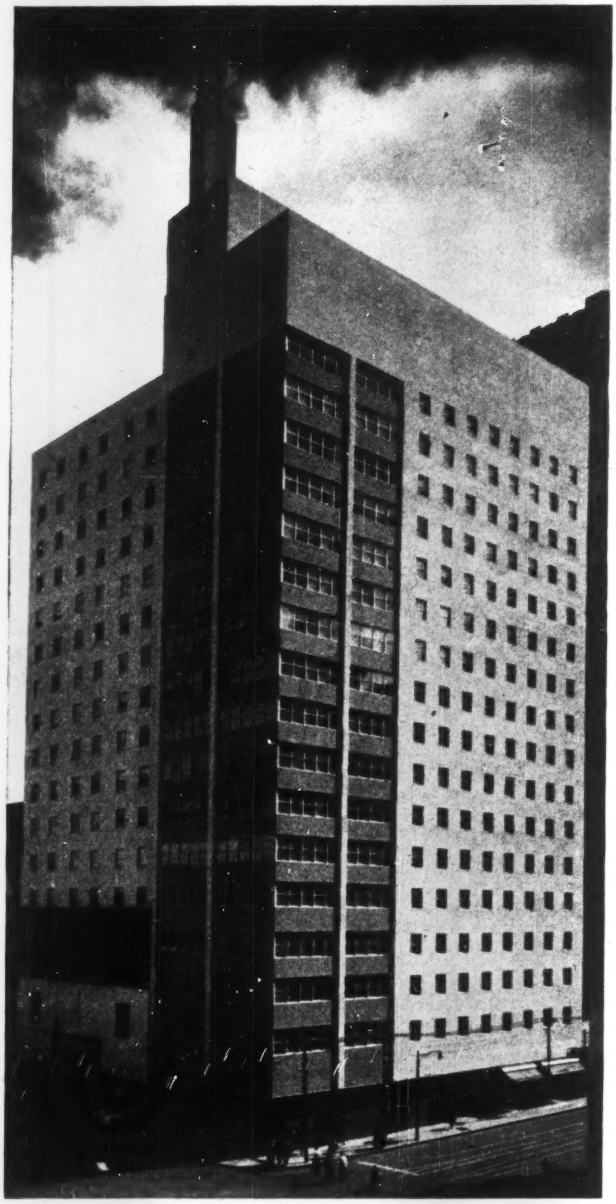
LOCOMOTIVE CRANES
3 Models
25 to 50 Tons
50 to 135 Ft. Booms



BROWNING
LOCOMOTIVE, WAGON TRUCK AND CRAWLER *Cranes*

We Built A Dallas Skyscraper in 188 Days

says Contractor J. W. Bateson of Dallas



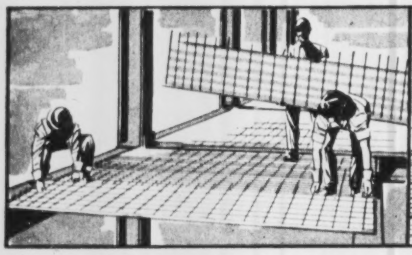
It happened recently in Dallas, Texas. J. W. Bateson Company, Inc. began erection of the sleek, new Corrigan Tower Building (right) on July 1, 1951, and completed the job exactly 10 months later, on May 1, 1952.

How did they do it? By using Cofar corrugated steel forms, which also serve as reinforcement, J. W. Bateson Company completely eliminated the costliest, most time-consuming element of concrete floor and roof construction—wood forms. Cofar sheets arrived at the site cut to fit the building frame. In one quick easy operation, 30 square feet of form and reinforcing steel was placed and immediately *provided the required reinforcement per square foot and a working platform for plumbing, electrical, and other trades.* Concrete was then placed. Result: A safe high-strength floor.

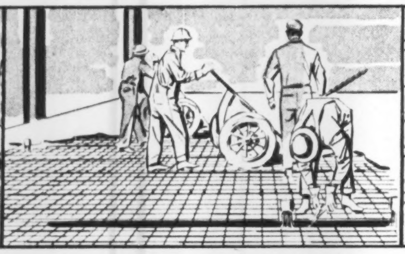
Cofar makes concrete floor and roof construction a one-stage operation, provides all the structural concrete slab, completely eliminates wood forms, and saves weeks in building time. For advice, estimates, and costs on your building projects, write either home or district office, attention Department ER-1.

see our catalog in
S
ARCHITECTURAL FILE
or write for copy

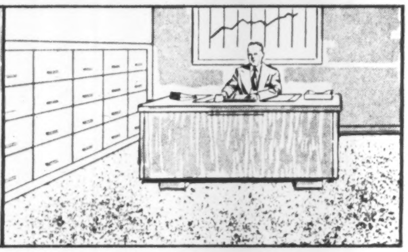
Corrigan Tower
Owner: *Corrigan Properties, Inc.*
Leo F. Corrigan, President
Architect: *Wyatt C. Hedrick, Dallas, Texas*



Workmen placing steel and form in one fast operation.



An immediate working platform for all trades.



A safe high-strength concrete floor.

the reinforcement that forms

COFAR

GRANCO STEEL PRODUCTS COMPANY

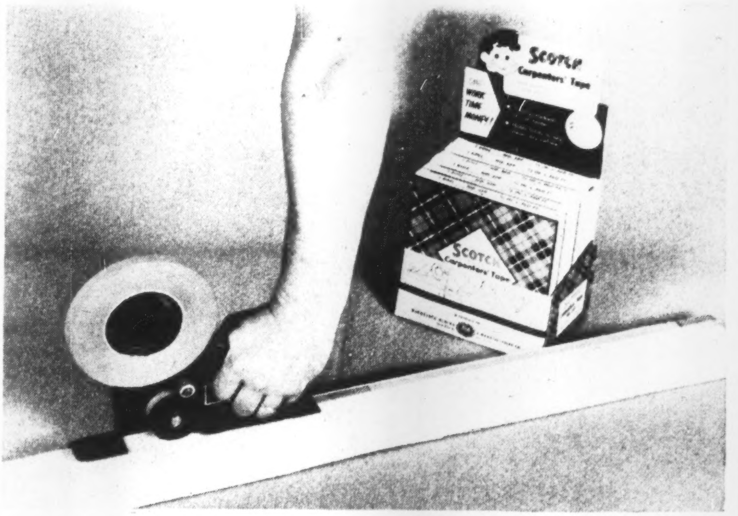
Subsidiary of Granite City Steel Company, Granite City, Illinois

Junior asphalt paver fits small jobs

For the small jobs—driveways, parking lots, recreational areas—the Model 8 Adnum Jr. asphalt paver packs a profit potential.

In operation the Model 8 is towed by a truck that dumps to the paver's hopper, but a 12-hp Hercules that drives the raker bar and screed also furnishes power for maneuvering backward and forward and for traveling empty to new locations on the job.

One of the features of the Adnun Jr. is the oscillating cutter bar. It is said that a stroke of 3¼ in. gives ma-



LAYOUT TIME is said to be cut by up to 50 per cent with a new marking tape. The ½-in. tape is imprinted every 16 in. to indicate center marks for stud, joist and rafter locations. Pressure sensitive, the tape can be applied by hand without wetting or, more conveniently, with a model M-79 Scotch brand carpenter's tape applicator. The tape, available in 360-ft rolls can be applied to either wood or metal. Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul, Minn.

Imported CASTELL*
lays it on
the line

- **SMOOTHER**—no hard spots.
- **GRAPHITE-SATURATED**—better adhesion.
- **MORE OPAQUE** — better blue and white prints.
- **STRONGER**—less point breaking.
- **NON-BLEEDING** — gives more prints — cleaner and sharper prints—even after hundreds of trips through the reproducing machine.
- **ECONOMICAL**—25% to 33⅓% more wear.

CASTELL
the drawing pencil
with the
Master Degrees

Your choice of CASTELL 9000 wood-encased pencil or balanced Push Button LOCKTITE Holder. Black or colored.

Imported CASTELL 9000 and CASTELL 9030 Imported Leads —18 degrees —full range, 7B to 9H.

A.W. FABER-CASTELL
PENCIL COMPANY INC NEWARK 4 N J

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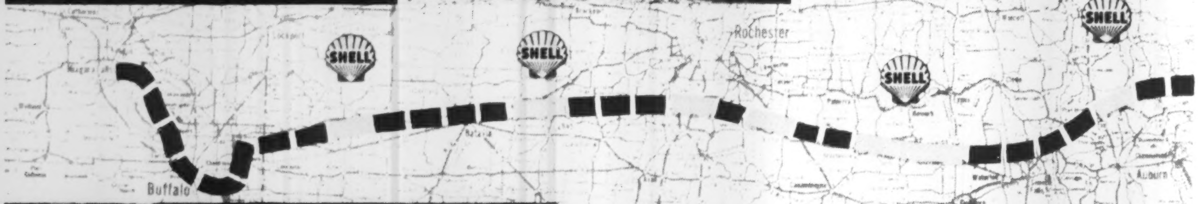
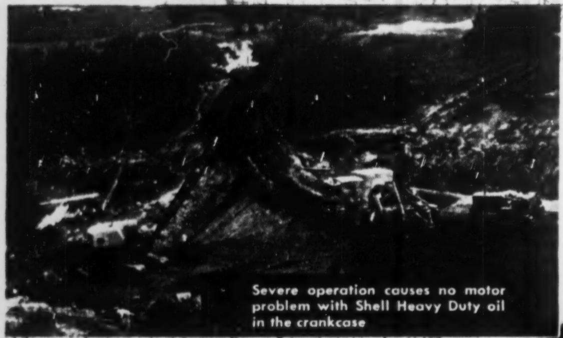
A.W.FABER CASTELL 9000 GERMANY HB
2H
1DOZEN 9030
FROM ZONE

On the New York State Thruway

Shell crankcase lubricants keep heavy duty tractors on the job for S. J. Groves & Sons: 5,000,000 cu. yd. grading and paving contracts

A single Shell grease normally lubricates all grease fittings on earth moving equipment like this





Severe operation causes no motor problem with Shell Heavy Duty oil in the crankcase

Shell E. P. Gear Lubricant takes the punishment during rough going on steep grades

Arute Bros., Inc. depend upon the "stay-put" qualities of Shell's Multi-Purpose Grease for continuous heavy duty work

. . . 1 out of every 3 construction miles uses SHELL PRODUCTS *exclusively*

That's just one way of saying that Shell has been awarded contracts by companies responsible for building sections of the New York State Thruway totaling over one third of the entire mileage. And the contracts are still coming in!

Trucks, shovels, dozers, graders . . . all equipment run by gasoline or diesel engines on those long stretches of highway construction . . . benefit from the outstanding crankcase performance of Shell heavy duty lubricants.

Products that can win the unqualified preference of such responsible and efficient operators must have what it takes . . . and Shell products *have* it . . . plenty!

Most popular on the Thruway, and equally popular wherever heavy duty engines operate, Shell lubricants keep on protecting, defying wear, and keeping maintenance costs at rock bottom. Why not specify Shell for your equipment?

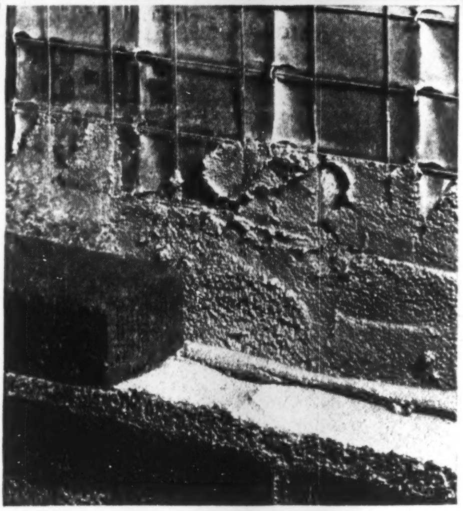
SHELL
Rome
SHELL
Utica
Syracuse
SHELL
Schenectady
Troy
SHELL

Thruway Map © by General Drafting Co., Inc., Convent Station, N. J.

2½ cu. yd. Shovels thrive on Shell Heavy Duty Lubricants under extremes of load conditions

SHELL OIL COMPANY

50 WEST 50TH STREET, NEW YORK 20, N. Y.
100 BUSH STREET, SAN FRANCISCO 6, CALIF.



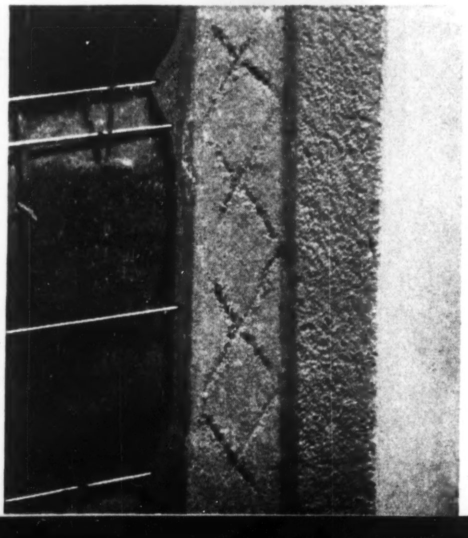
Here's an example of how STEELTEX saves maintenance costs on rental housing

When M. Lee Heath, owner of the Kensington Court Apartment Project in Charlotte, N. C., insisted two years ago upon Steeltex for brick-veneer and Steeltex for interior plaster, he did so because he wanted low maintenance cost in the years to come. This is what Mr. Heath had to say after 24 months:

> "I used Steeltex for sheathing because it completely bonded the masonry and stud walls together. It was my opinion that a solid steel-reinforced mortar section was better than a flue crossed with wall ties. I then used Steeltex for plaster, because of the completely rigid base it made. I found this type of construction to be surprisingly inexpensive at the time, and I can now say it has saved me a considerable amount in maintenance cost. After two years there simply have been no wall cracks at all. Certainly any owner of rental property can appreciate this feature."

Whether your projects involve rental housing or not, you'll find it will pay you to investigate the advantages that rigid, welded-wire Steeltex can bring. See our catalog data in Sweet's or write for Catalog DS 132 Dept. ENR, Pittsburgh Steel Products Company, Grant Building, Pittsburgh 30, Pa.

From the close-up photographs above and below, you can see some of the advantages of Steeltex. Notice above that a continuous steel-reinforced mortar bond is created between brick and stud walls. Below is shown the virtual truss construction created by Steeltex for plaster.



Pittsburgh Steel Products Company

***a subsidiary of* Pittsburgh Steel Company**

terial a better chance to bed itself properly and results in better keying of material. Further, bevel teeth reportedly give a preliminary compaction and overlapping action that carries the material up to and compacts it against a parallel course or curb. The advantage claimed is that it leaves a texture free from trowled up fats or subsurface tears.

The paver is equipped with rear rollers that cover most of the width of the course and pneumatic front wheels for easy steering. Controls are dual and permit handling of the machine from either side. A steering gage indicates the position of the front wheels at all times.

Hopper capacity is about two tons and the hopper releases an eight-foot wide paving strip. Shipping weight of the unit is about 4,550 lbs.

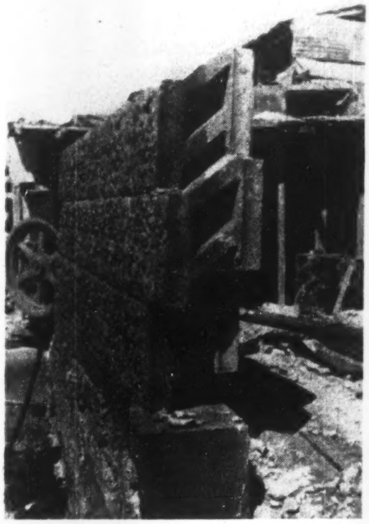
A removable trailer hitch is provided at the rear of the paver to permit the entire rig to be lifted and hauled away on its own front wheels. BLAW-KNOX CO., FOOTE CONSTRUCTION EQUIP. DIV., NUNDA, N. Y.

Construction blocks get a new twist

In Israel, a contractor has given construction blocks a lozenge shape that is claimed to improve the material's performance.

Among the advantages of the block, it is said that the 45-deg. slope forces the water downward and outward away from the interior of the building. Also, no moisture can infiltrate through the mortar of the bedding since there is no connection be-

(Continued on page 276)



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smaller heating jobs

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for larger heating
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to meet extra big
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quality Master-made units
to meet every need

NEW MASTER SUPER-SPACE HEATER SPECIFICATIONS

MODEL NO.	CAPACITY	*SAFETY	BURNER	FUEL
B-160	160,000 BTU per hour	Indications of carbon monoxide in the exhaust gases of the kerosene fueled Master Space Heater was less than 0.001 per cent by volume . . . as tested by an independent testing laboratory. According to accepted standards this content is one tenth of the amount considered hazardous.	Master Gun Type	Kerosene, No. 1 Fuel Oil or No. 2 Fuel Oil
B-240	240,000 BTU per hour			
B-400	400,000 BTU per hour			

(Continued)	FUEL CONSUMPTION	HOT AIR OUTPUT	CONTROLS	SIZE	WEIGHT
B-160	1.14 per hr.	1100 C.F.M.	Thermostat for full automatic temperature control. Fuel tank safety control.	W-24½" L-58" H-34"	166 lbs. less fuel
B-240	1.71 per hr.	1900 C.F.M.	Thermostat for full automatic temperature control. Fuel tank and burner safety control.	W-29" L-60" H-39"	250 lbs. less fuel
B-400	2.85 per hr.	3500 C.F.M.		W-33" L-72" H-45"	311 lbs. less fuel

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Master Portable Generator Plants ½ KW to 100 KW

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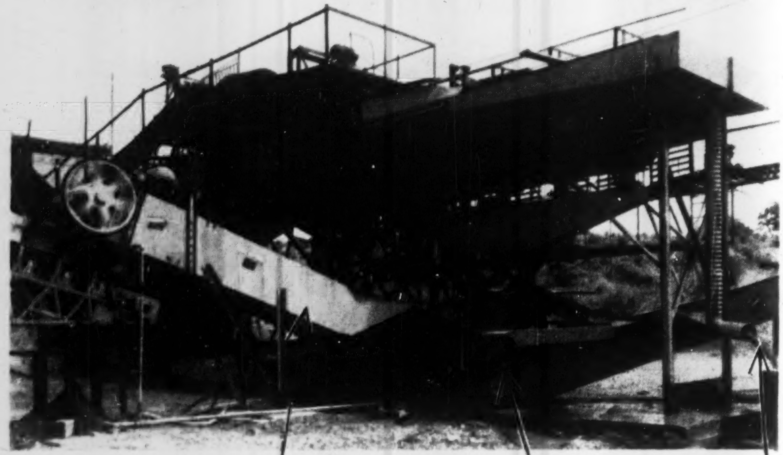
Clean, classified sand is simple as A-B-C at Sand & Gravel Supply Co. CONNEAUT LAKE PENNA.



A CLEAN CONCRETE SAND
B CLEAN MASON SAND
C EXCESS WATER

Eagle Screw Washers in conjunction with an Eagle 20' Water Scalping Tank provide required gradations of clean sand at this neat, compact plant.

The Water Scalping Tank removes excess water and provides preliminary classification—coarse sand settling at the feed-in end (left) and fine sand at the overflow end (right). The dual compartment collecting flume below the water scalping tank permits coarse sand to be chuted to a 30" x 25' Eagle Single Screw Fine Material Washer-Classifier-Dehydrator with adjustable long weir—here clean, premium concrete sand is produced. Fine sand from the other compartment flows down split chute, part going to the Concrete Sand washer and part to a 20" x 25' Eagle Single Screw washer which produces Mason Sand. Ratio of fine and coarse material in the Concrete Sand readily meets specifications.

Screw Washers
Log Washers
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"Swintek" Dredge Ladders

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EAGLE IRON WORKS

"Gunite" . . . . . . the sand-cement product of the "CEMENT GUN," for Concrete and Masonry Repairs, Pre-Stressed Tanks, Steel Encasement and for lining Reservoirs, Sewers and Tunnels.

CEMENT GUN COMPANY
"GUNITE" CONTRACTORS
GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.
MANUFACTURERS OF THE "CEMENT GUN"

tween the mortar of the outer and inner walls.

Thickness of the walls of the Diskoblock is about 2¼ in. and may be used for two story construction without reinforcing. The same block is manufactured in 1½-in. wall thickness at a lower price for the construction of single story structures.

Exterior surfaces of the blocks are finished with a rough-hewn stone texture that does not require further finishing.

The block, as it is made in Israel, measures 9 x 10 x 16 in. Manufacturing facilities are under consideration in both England and the U. S. S. S. Diskin Contracting Co., Jerusalem, Israel.

Air-powered circular saw has 4⅜-in. bite

A portable air-powered circular saw features a maximum depth of cut of 4⅜ in. The saw, designed for use on 90 psi air pressure, can also be set for a 45-deg bevel cut of 2⅞ in.

The saw blade is driven through a spur gear design that reduces the arbor length between the motor and the saw blade. The close proximity of blade and motor is, therefore, said to create a well-balanced, easily-handled saw.

For safety the throttle lever is located on the inside of the grip handle, and the saw blade is enclosed by an aluminum housing on top and a telescoping guard underneath.

A variety of 12-in. saw blades is available for the S-12 air saw. Ingersoll-Rand Co., Dept. P.T., 11 Broadway, New York 4, N. Y.

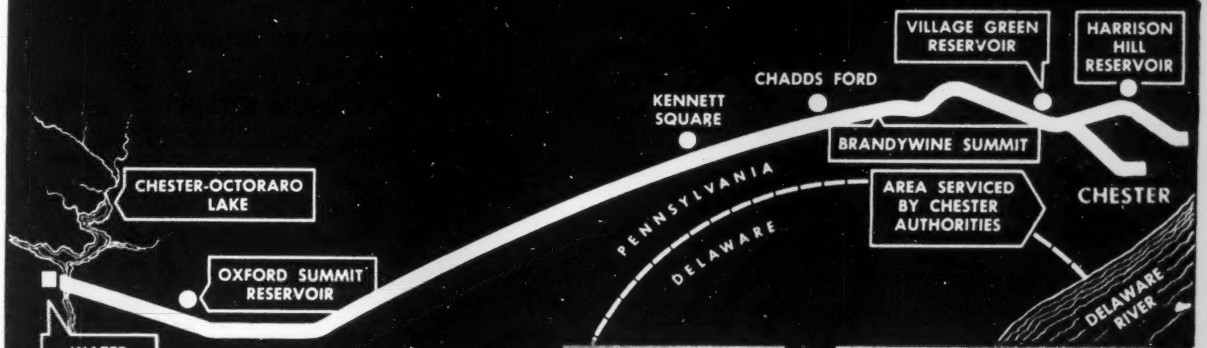
New Products briefs . . .

- **Limestone restoration**—A compound to restore stained, cracked or disintegrated limestone surfaces has been developed by the Coleman Structure Restoration Co., 85 Centre Street, Roxbury 19, Mass. To use the compound, called Stoneweld, the surface to be treated must first be throughly steam-cleaned. Then the compound is applied in two or three laminated layers under hydro-pneumatic pressure and the resulting new surface rubbed down with an abrasive. According to the manufacturers, tests of the compound on limestone slabs resulted in complete restoration of the original surface.

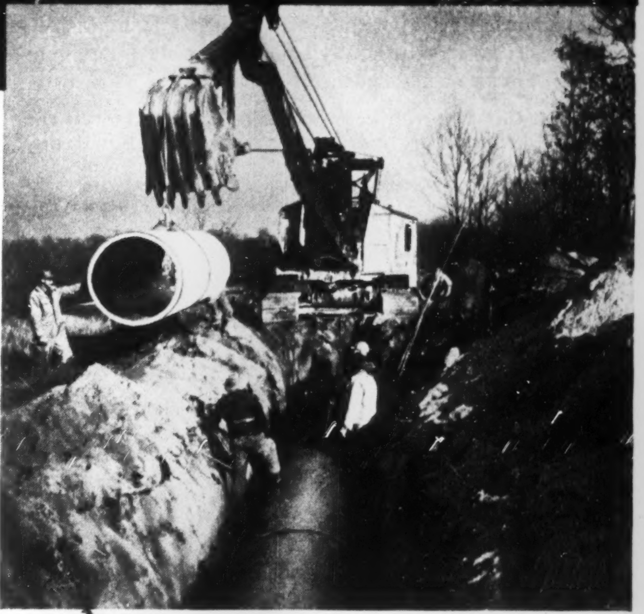
- **Powder tool shield**—A new design feature of the velocity-power - drive, cartridge-actuated tool for setting studs in concrete or steel, is a permanently

a 44 mile LOCK JOINT pipeline

...with a Hazen-Williams "C" of 150


VILLAGE GREEN RESERVOIR
HARRISON HILL RESERVOIR
CHADDS FORD
KENNETT SQUARE
BRANDYWINE SUMMIT
CHESTER-OCTORARO LAKE
PENNSYLVANIA
AREA SERVICED BY CHESTER AUTHORITIES
CHESTER
DELAWARE
OXFORD SUMMIT RESERVOIR
DELAWARE RIVER
WATER FILTRATION PLANT

IN TESTS on 233,000 feet of 24", 30", 36", 42" and 48" Lock Joint Prestressed Concrete Cylinder Pipe in Chester, Pa. the eminent hydraulist, F. C. Scobey, found a coefficient of 150. This gives the city a premium capacity of 11%. Leakage was a mere 12% of the maximum allowed by the Consulting Engineers. Thus Chester enjoys greater capacity with far less waste than the city anticipated—truly premium performance in every sense. For similar trouble-free operations, let Lock Joint supply your needs in pressure pipe 16" and larger.



Laying a section of the 48" pipe for the Chester Water Supply Main

SCOPE OF SERVICES *Lock Joint Pipe Company specializes in the manufacture of Reinforced Concrete Pressure Pipe for Water Supply and Distribution Mains 16" in diameter or larger, as well as Concrete Pipes of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous Lines.*

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Established 1905
P. O. Box 269, East Orange, N. J.
PRESSURE PIPE PLANTS: Wharton, N. J., Turner, Kan., Detroit, Mich., Columbia, S. C.
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An unbeatable combination . . . your CP distributor plus efficient, cost-cutting Chicago Pneumatic equipment . . . a team that really pays off! Whatever your problem, there's a qualified CP distributor nearby to help recommend and select the CP equipment best suited for your specific requirements.

For over 50 years Chicago Pneumatic equipment has gained industry-wide acceptance because it has been designed with a rugged quality that insures long, trouble-free operating life with a minimum of maintenance.

Call or write your local Chicago Pneumatic Distributor for more complete information today.

CP DEMOLITION TOOLS — For every type of work, ranging from the lightweight CP-111 (25 lb. class), for lateral or overhead jobs, to the heavy-hitting, smooth handling CP-117 (80 lb. class), for which no job is too tough.

NATION-WIDE SALES

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Birmingham — Birmingham Rock Bit Co.
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ARIZONA
Phoenix — Western Machinery Co.

ARKANSAS
Little Rock — Little Rock Road Machinery Co.

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Fresno — Contractors Equipment and Supply Co.
Los Angeles — Fornaciari Company
Shaw Sales & Service Co.
Riverside — Shaw Sales & Service Co.
San Diego — Shaw Sales & Service Co.
San Francisco — Western Traction Co.

COLORADO
Denver — Gunderson-Taylor Machinery Co.

CONNECTICUT
Hartford — Bleiler Equipment Co.

FLORIDA
Jacksonville — Vern Wheeler, Inc.

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Atlanta — Yancey Bros. Co.
Augusta — Yancey Bros. Co.

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Rock Island — Wisner, Inc.

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Indianapolis — MacAllister Machinery Co., Inc.

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Cedar Rapids — Spreitzer, Inc.
Des Moines — Gibbs-Cook Equipment Co.
Mason City — Gibbs-Cook Equipment Co.
Sioux City — Sioux Machinery and Supply Co.

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Louisville — Emmett C. Watson Co., Inc.

LOUISIANA
New Orleans — Wm. F. Surgi Equipment Co.
Shreveport — Construction Machinery Corp.

MAINE
Portland — Southworth Machine Co.

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Baltimore — McClung-Logan Equipment Co., Inc.

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Minneapolis — Ruffridge-Johnson Equipment Co., Inc.

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West Jackson — Equipment, Inc.

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Kansas City — The G. W. Van Keppel Co.
St. Louis — Geo. F. Smith Co.

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Butte — Hall-Perry Machinery Co.

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Greensboro — E. F. Craven Co., Inc.

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Cincinnati — W. W. Williams Co.
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Oklahoma City — Leland Equipment Co.
Tulsa — Leland Equipment Co.

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Portland — Balzer Machinery Co.

PENNSYLVANIA
Harrisburg — Allied Equipment Corp.
Philadelphia — Equipment Corp. of America
Pittsburgh — Anderson Equipment Co.

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East Providence — J. J. Gregory & Son

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Greensville — Poe Hardware and Supply Co.

TENNESSEE
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Knoxville — R. L. Harris, Inc.
Memphis — Hawkins Equipment Co.
Nashville — Buchanan-Rooney Equipment Co.

TEXAS
Abilene — Malcolm Manufacturing & Supply Co.
Austin — Central Texas Equipment Co.
Corpus Christi — Corpus Equipment & Supply Co.
Dallas — P. A. Ross Machinery Co.
El Paso — Equipment Supply Co., Inc.
Ft. Worth — Texas Contractors Supply Co.
Houston — Texas Railway Equipment Co.
The Welders Supply Co., Inc.
Odessa — Equipment Supply Co., Inc.

UTAH
Salt Lake City — Arnold Machinery Co., Inc.

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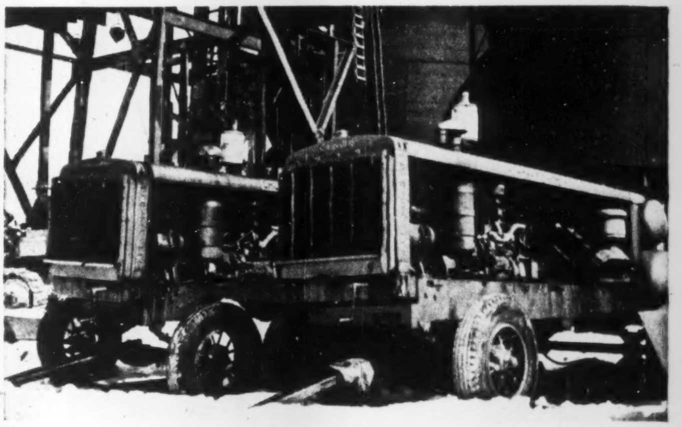
Richmond — Bemiss Equipment Corp.
Roanoke — Bemiss Equipment Corp.

WASHINGTON
Seattle — Philpott Equipment Co.
Spokane — Andrews Equipment Service of Washington, Inc.

ALASKA
Anchorage — Philpott Equipment Co.
Fairbanks — Philpott Equipment Co.

CANADA
Vancouver — Dietrich-Collins Equipment, Ltd.
Edmonton — Pardee Equipment Co.
Winnipeg — Huggard Equipment Co.



CP DIESEL AND GASOLINE DRIVEN PORTABLE AIR COMPRESSORS — Available in ranges from 60 cfm to 600 cfm, CP Portable Air Compressors incorporate the CP Gradual Speed Regulator which reduces engine speed proportionately when air demand falls off — insuring greater economy and minimizing wear.

CP WAGON DRILL — The G-300 has heavy-duty tubular chassis and drill carriage for stability and strength with minimum weight — assures greater flexibility and cuts down vibration. Takes full advantage of high drilling speed and rotation of the CP 4-inch 70-N Drifter — maintains correct alignment under the most adverse operating conditions.

CP-365 REVERSIBLE AIR IMPACT WRENCH
— Ideal for faster preliminary bolting up of structural members and for maintenance of heavy construction equipment, the CP-365 has a 1¼ inch bolt capacity yet only weighs 32 lbs. — overall length is only 16¾ inches.

Write for detailed information

Chicago Pneumatic

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

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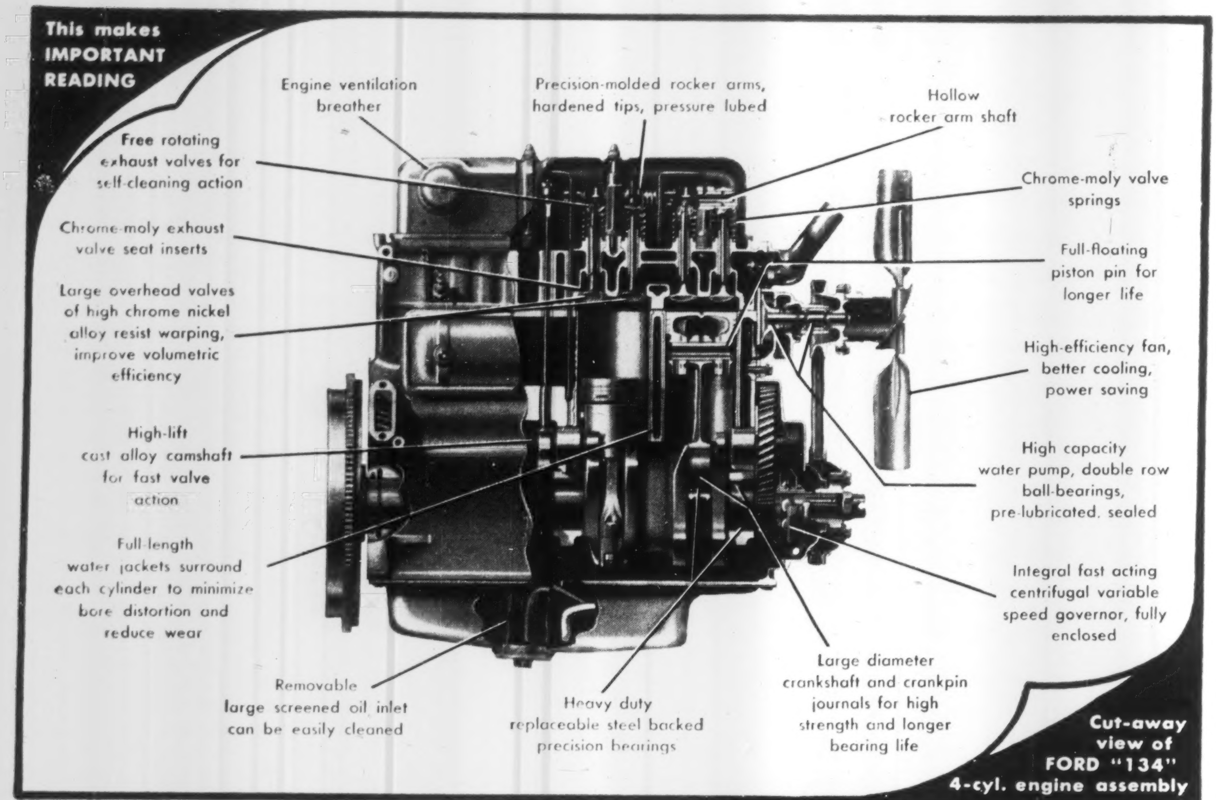

Engine ventilation breather
Precision-molded rocker arms, hardened tips, pressure lubed
Hollow rocker arm shaft
Free rotating exhaust valves for self-cleaning action
Chrome-moly valve springs
Chrome-moly exhaust valve seat inserts
Full-floating piston pin for longer life
Large overhead valves of high chrome nickel alloy resist warping, improve volumetric efficiency
High-efficiency fan, better cooling, power saving
High-lift cast alloy camshaft for fast valve action
High capacity water pump, double row ball-bearings, pre-lubricated, sealed
Full-length water jackets surround each cylinder to minimize bore distortion and reduce wear
Integral fast acting centrifugal variable speed governor, fully enclosed
Removable large screened oil inlet can be easily cleaned
Heavy duty replaceable steel backed precision bearings
Large diameter crankshaft and crankpin journals for high strength and longer bearing life

Cut-away view of FORD "134" 4-cyl. engine assembly

Only FORD gives you all these advanced features in INDUSTRIAL ENGINES

This page provides the opportunity for you to see Industrial Engine design at its modern best. Here are facts you can sink your teeth into . . . information that every manufacturer and user of powered equipment should know!

In the cut-away picture above, a 4-cylinder Ford Industrial Engine with 134 cu. in. displacement is shown. Ford's vast engineering laboratories have developed these latest Overhead Valve Type, High-Compression, Low-Friction Engines also in 6-cylinder and V-8-cylinder series ranging up to 120 useable horsepower.

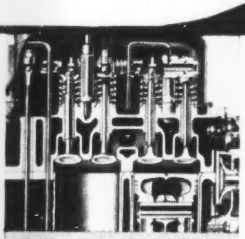
Exhaustive preliminary testing followed by actual operation in industrial equipment of many kinds has brought positive proof that these engines *deliver more power at the clutch* than was formerly possible in older type engines of comparable displacement.

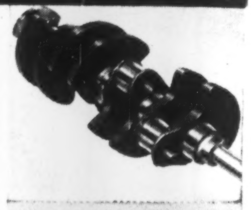
Some of the advanced features of these engines are also pictured in the panel at right. We'll be happy to send you descriptive folders with complete specifications upon request. Write or wire us today.

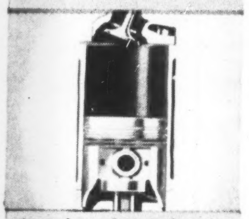
YOUR JOB IS WELL-POWERED WHEN IT'S FORD-POWERED!

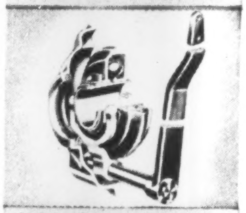
Ford
INDUSTRIAL ENGINES
AND POWER UNITS

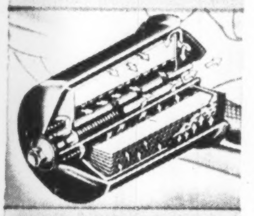
INDUSTRIAL ENGINE DEPARTMENT
FORD MOTOR COMPANY
15050 Woodward Avenue, Highland Park 3, Michigan

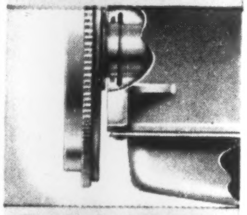

Rotating Exhaust and Intake Valves make for even wear that helps maintain compression for a longer period and reduces the possibility of valves sticking.


Counter-Balanced Crankshaft is precision molded with smooth, mirror-like bearing surfaces that reduce friction to the minimum and give longer life.


Large bore, short stroke cuts piston travel, thereby lessening friction, delivering more useable power and substantially reducing fuel costs.


Built-in Governor is variable speed type mounted on crankshaft and does not operate off gears. It is fully lubricated and completely sealed.


Full-Flow Oil Filter provides for cleaning all the oil on every trip it makes through the engine under normal conditions.


Deep-skirt Crankcase assures high rigidity. Enclosed main bearing oil seal is designed to eliminate leakage.

attached spall or protective shield. The manufacturers, Velocity Power Tool Co., 201 N. Braddock Avenue, Pittsburgh 8, Pa., point out that a section of the spall shield may be lifted and turned out of the way for close-to-the-wall jobs.

Name change—The adoption of a new name, Superior Scaffold Co., has been announced by the former Superior Scaffolding Co. of Culver City, Calif. The operations of the firm remain unchanged in all other respects.

New truck mixer—A 4½-yd model has been added to the Transcrete truck mixer line of Construction Machinery Co., Waterloo, Iowa. Like its predecessors, the 3- and 5½-yd models, it features a rugged design intended to minimize maintenance and service.

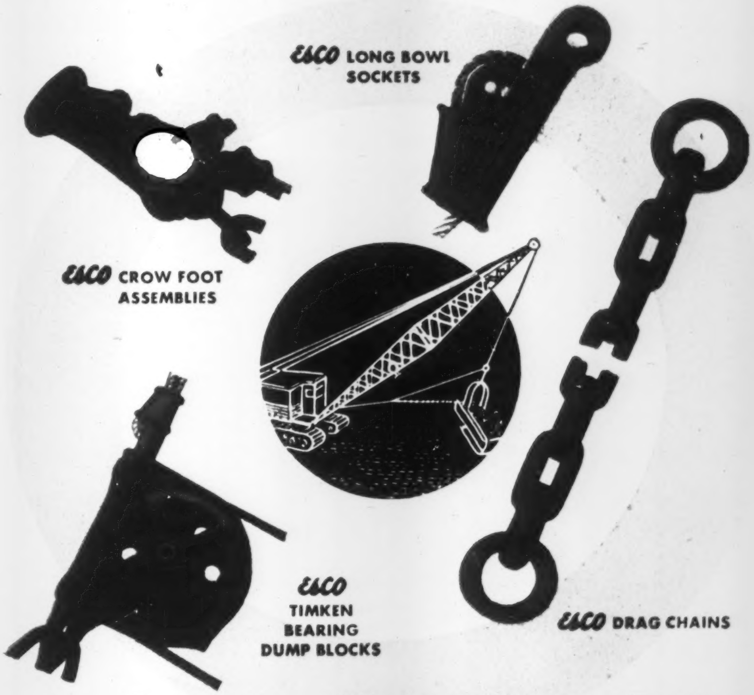
Revolution counter—A portable instrument for instant checking of rpm of motors and machinery has been devised by Montgomery & Co., Inc., 53 Park Pl., New York 7, N. Y. When the rubber tip of the instrument is pressed against the revolving shaft, speeds between 40 and 5,000 rpm register immediately on the dial.

Plastic Welding—Welding rods of triangular cross-section, 0.20 and 0.28 in. on a side, have been developed by American Lucoflex, Inc., 500 Fifth Avenue, New York, N. Y. to expedite the welding of large assemblies.

Safety nail driver—According to the manufacturers, attaching almost anything to brick, concrete or wood walls is now a simple matter with the Safe-T-Matic nail driver. The new tool, a product of the Safety Nail Driver Corp., 70 Rosalie Avenue, Clifton, N. J., has an alnico core and an automatic sliding sheath that holds a concrete stub nail and keeps the nail in alignment while it is being driven.

Electric hammer—Neoprene piston blocks have been incorporated into the Super Slugger electric hammer distributed by Tempo Products Co., 2075 East 65th Street, Cleveland 3, Ohio. The new type blocks are claimed to increase piston travel from ⅝ in. to 1¼ in. at full speed of 3,000 blows per minute. Featured also are a portable slide shoe of friction reducing metal and an oil reservoir for longer continuous performance. The hammer weighs 7½ lb and is said to be portable and easily operated with one hand. Its applications include a variety of drilling, chiseling, and gouging jobs.

ESCO Dragline Repair Parts Cut Maintenance Cost



Yardage Up—Maintenance Down with ESCO high quality repair parts

What can *you* do to get yardage up and over-all cost down?

ESCO believes that the answer lies in high quality equipment that does a better job *longer*—with less maintenance and repair, less profit cutting down-time, *and lower over-all cost to you.*

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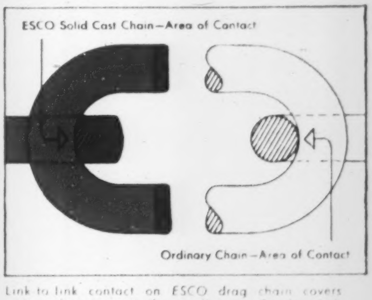
All *ESCO* dragline repair parts are designed with the same careful attention to detail that keeps *ESCO* Dragline Chain productive longer. See your *ESCO* Dealer for increased yardage and *lower over-all cost.*


ESCO Solid Cast Chain—Area of Contact
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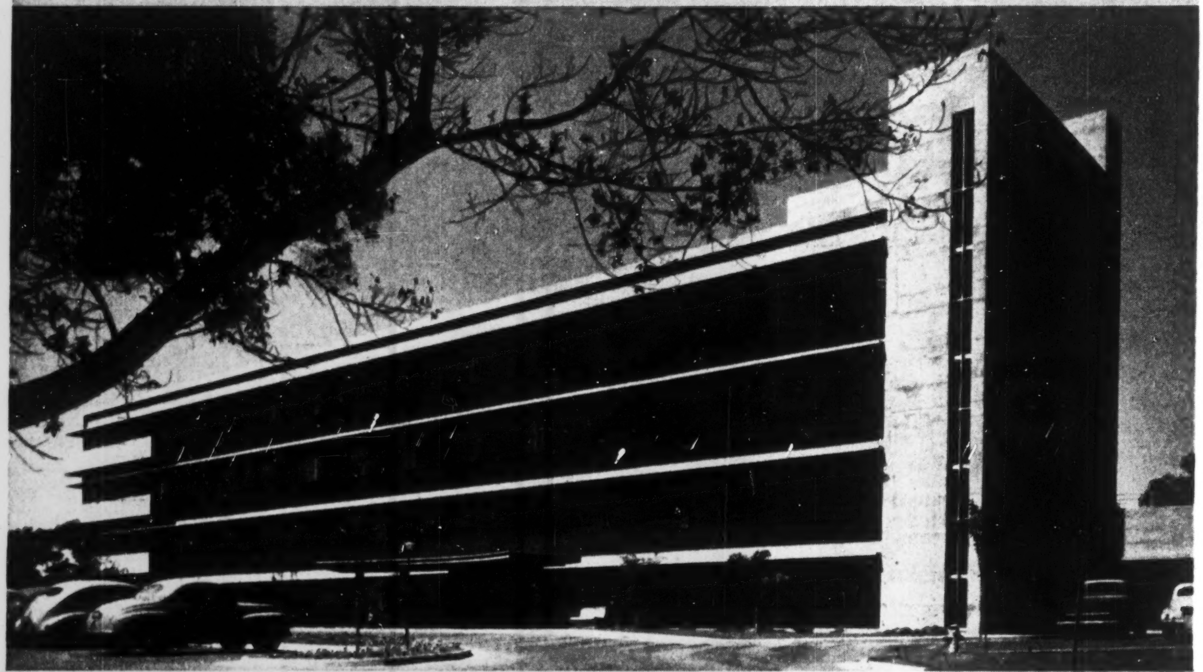
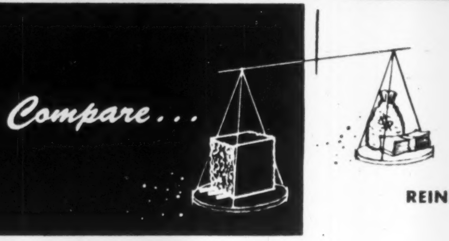


Marin General Hospital,
Greenbrae, Calif.
Architect:
Robert Stanton, A. I. A.
Structural Engineer:
MacD. Perkins



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PUBLICATIONS

Core barrel—Bulletin No. 330 contains information regarding the Series M core barrel. Used in conjunction with Series M coring bit, the barrel is said to permit the obtaining of a higher percentage of good core from fractured, porous, or soft formations than would otherwise be possible. Sprague & Henwood, Inc., Scranton 2, Penna.

Shower receptors—A 12-page booklet contains technical data, construction details and installation instructions on pre-cast shower receptors used with modern stall showers. The manual describes the advantages and uses of the two Fiat shower floors; the Sierra for plaster walls or tile, and the Gibraltar for slab wall construction. A graphic comparison chart reputedly shows why multi-layer shower floor construction is now obsolete. Fiat Manual 115. Fiat Metal Manufacturing Co., 21-33 Borden Ave., Long Island City 1, N. Y.

Welding news—Eighteen new 1953 welding developments are contained in an 8-page simulated "new products magazine". Following closely on the format of the digest type publication, the new folder contains short descriptions of the welding alloy and organic bonding developments that have emanated from the company's research department since the first of the year. The developments cover welding materials used in maintenance as well as production on various metals and application heats. Booklet TIS 1621. Eutectic Welding Alloys Corp., Dept. "P", 40-40 172nd St., Flushing 58, N. Y.

Metal lath—Technical data, construction techniques, details and specifications for metal lath and plaster solid stud partitions are available in a recently released bulletin which can be obtained by writing Metal Lath Manufacturers Assn., Engineers Building, Cleveland 14, Ohio.

Tandem rollers—A 12-page booklet describes the new line of C model tandem rollers from 5 to 16 tons, produced by Buffalo-Springfield Roller Co., Springfield, Ohio.

Crushers—A new booklet gives information on how to go about making the most efficient and satisfactory application of various types of crushers to specific jobs. Factors that go to influence operation, such as power consumption, parts wear, maintenance

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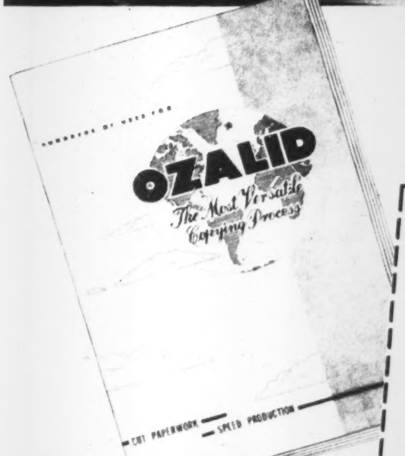

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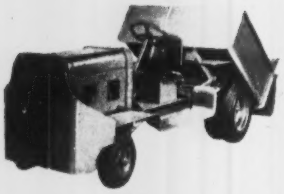

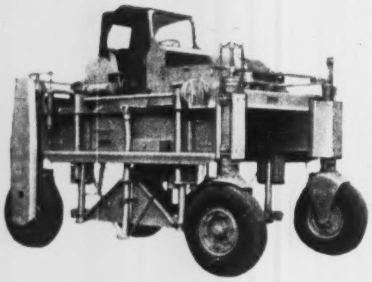

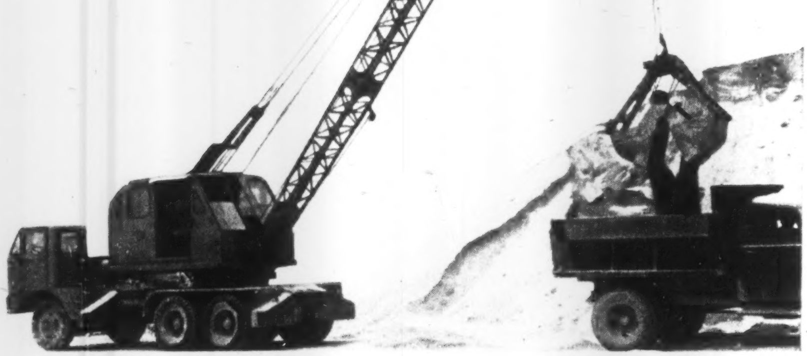

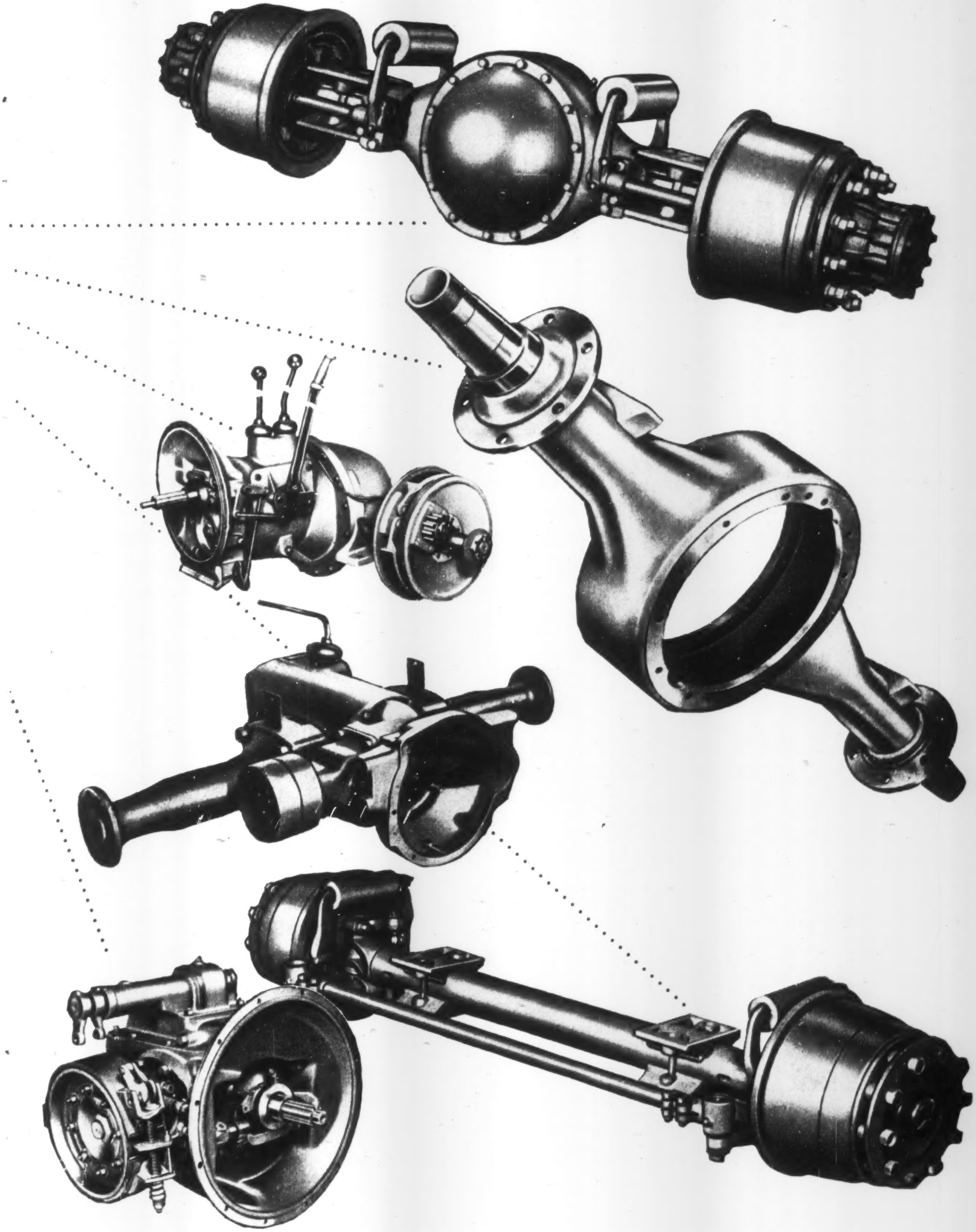

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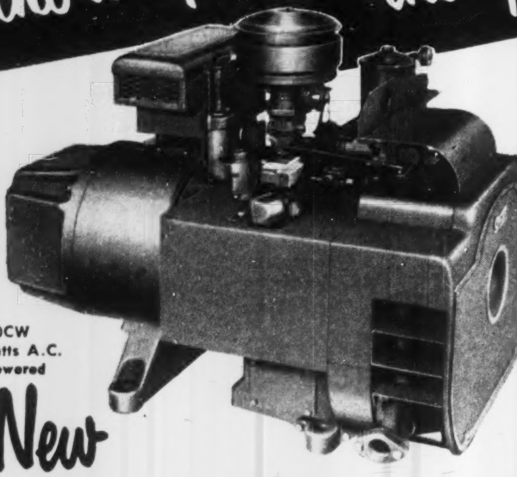

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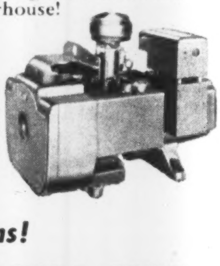

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costs, uniformity of products and others are discussed in detail. Also, a check list is given to help determine the best type of crusher for various jobs. Five types of hammermills, jaws, impactors, granulators, gyracones, Bradmills, Bradford breakers, Bradford hammermills and several types of single rolls are discussed in detail. PENNSYLVANIA CRUSHER CO., 1715 LIBERTY TRUST BUILDING, PHILADELPHIA 7, PENNA.

Diamond drill bits—A well illustrated 16-page book, file size and tab indexed, contains information concerning the company's latest developments in diamond drill bit products. An attractive and complete presentation. DEPARTMENT ENR, ANTON SMITH & CO., INC., 333 WEST 52ND ST., NEW YORK 19, N. Y.

Rolled steel products—A new catalog entitled "Bethlehem Pacific Rolled Steel Products" lists all the steel sections that can be rolled on seven rolling mills at the company's steel plants in Seattle, South San Francisco and Los Angeles. The catalog lists the size, weight per foot, and design properties of all the structural and bar size shapes and includes a commodity listing of wire produced at the Los Angeles plant and bolt and nut products produced at the three plants. Also listed is special analysis steel manufactured by the firm. BETHLEHEM PACIFIC COAST STEEL CORP., P. O. BOX 2057, TERMINAL ANNEX, LOS ANGELES 54, CALIF.

School construction and remodeling—A new portfolio describes and illustrates Fiberglas products used in constructing new schools or remodeling old ones. Included in the portfolio is information about Fiberglas roof insulation, acoustical tile, blowing wool insulation, stage curtains, draperies, dust-stop air filters, perimeter insulation, ceiling board, light diffusers, duct insulation and structural panel. OWENS-CORNING FIBERGLAS CORP., 642 NICHOLAS BUILDING, TOLEDO 1, OHIO.

Diamond core drills—Bulletin No. 86 lists Longyear's diamond core drills in the Junior Straitline, UG Straitline, and Master Straitline models. It also shows the new DH-5 deep hole drill. On the last page of this 4-page booklet there is reference to various Longyear drilling supplies and the new Arvela Model 52 precision magnetometer that is said to cut survey time. E. J. LONGYEAR CO., FOSHAY TOWER, MINNEAPOLIS, MINN.

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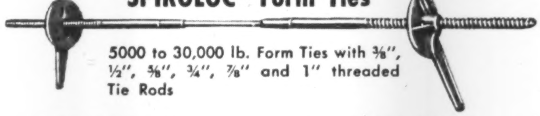

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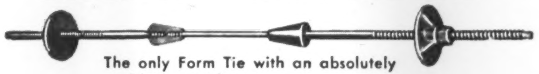

The only Form Tie with an absolutely positive spreader

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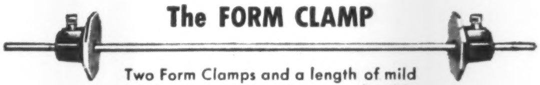

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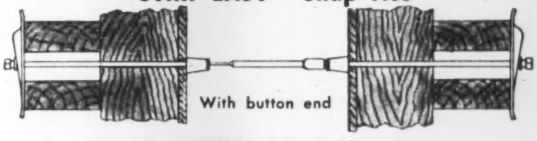
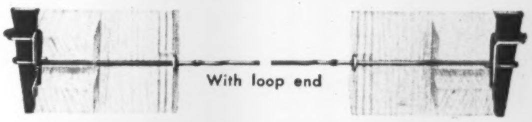


With button end

TWISTYE® Snap Ties



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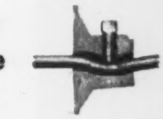

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Dovetail Stone Anchor
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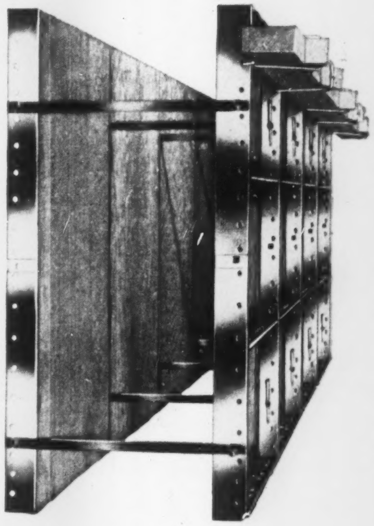

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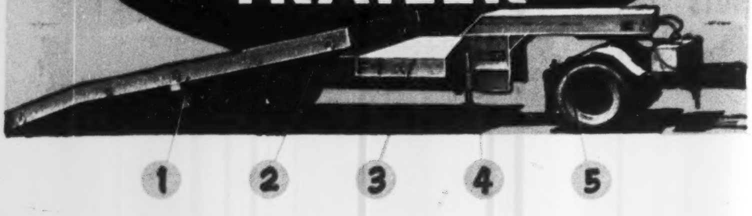

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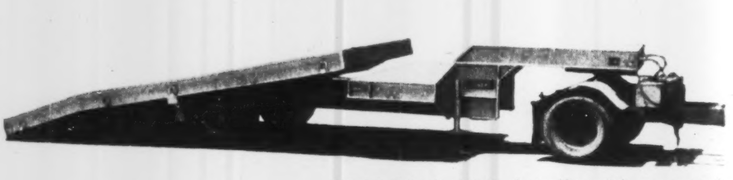

Divided bed, tilt deck trailer with gooseneck
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OBITUARIES

H. Case Willcox, 60, an engineer with the Department of Defense, died in Washington, D. C. Sept. 16. He attended Cornell and Columbia universities and after working as a construction engineer for the Standard Oil Co. of New York he opened his own office in New York in 1925. He had done engineering work in a number of foreign countries and was a contributor to geographical and engineering publications.

Bruce P. Davis, 63, a civilian engineer with the Army for 21 years, died Sept. 8 in Iceland where he had been stationed for 14 months. After studying at Pratt Institute and the Cooper Union in N. Y. City, he served overseas with the Army Engineers in World War I. He spent two years in South America as a civilian with the Army. From 1943 to 1945 he was in charge of the construction of the airbase at Asuncion, Paraguay. Later he took part in the construction of the National Airport, Washington, and La Guardia Field, N. Y. City.

Henry Sheehan, 101, retired sewer and paving contractor died Sept. 21 in Toledo, Ohio. Going to Toledo 80 years ago from Canada, Sheehan and his brother James formed a partnership which became one of Ohio's leading sewer contracting firms and carried out many large projects.

De Forest R. Richards, 59, former city engineer of Struthers, Ohio, died in Rouses Point, N. Y., Sept. 20. He was an engineering graduate of Ohio Northern University. For the last several years he had lived at Poland, Ohio.

Rossiter S. Scott, 77, of Baltimore, Md., consulting waterworks engineer for Dresser Manufacturing Division, Bradford, Pa., died at Baltimore recently. He retired in 1948. He received his education at Stevens Institute. He worked for a number of years with the Consolidated Gas Electric Light and Power Co. of Baltimore. He also was an engineer in the shipyards at Baltimore and was for some years with Nicholis Hill Associates as a consulting engineer in waterworks. He went with Dresser Manufacturing Division on July 16, 1932, and from that time until his retirement worked with consulting engineers and water department design engineers on the development of water transportation facilities.

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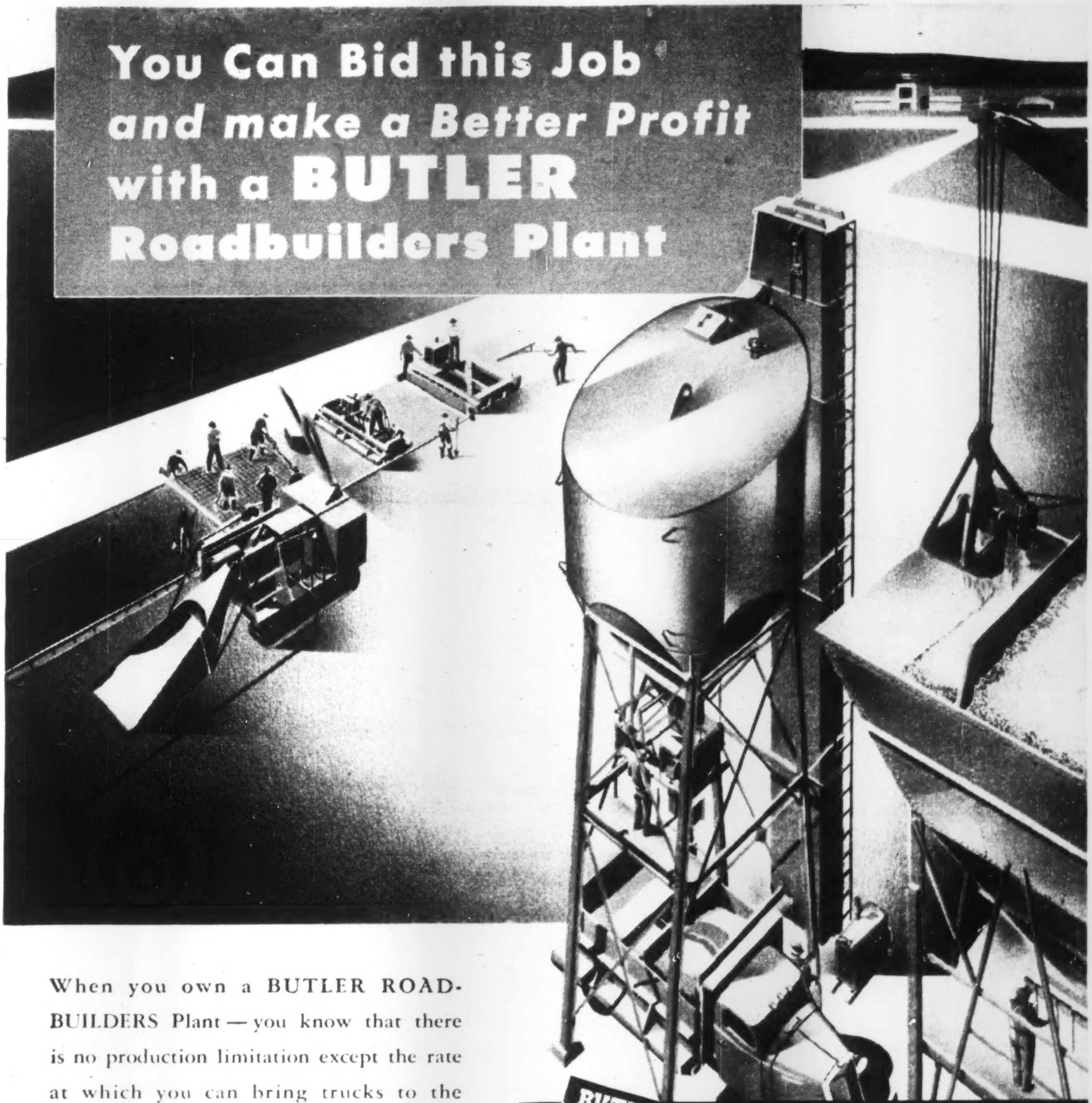

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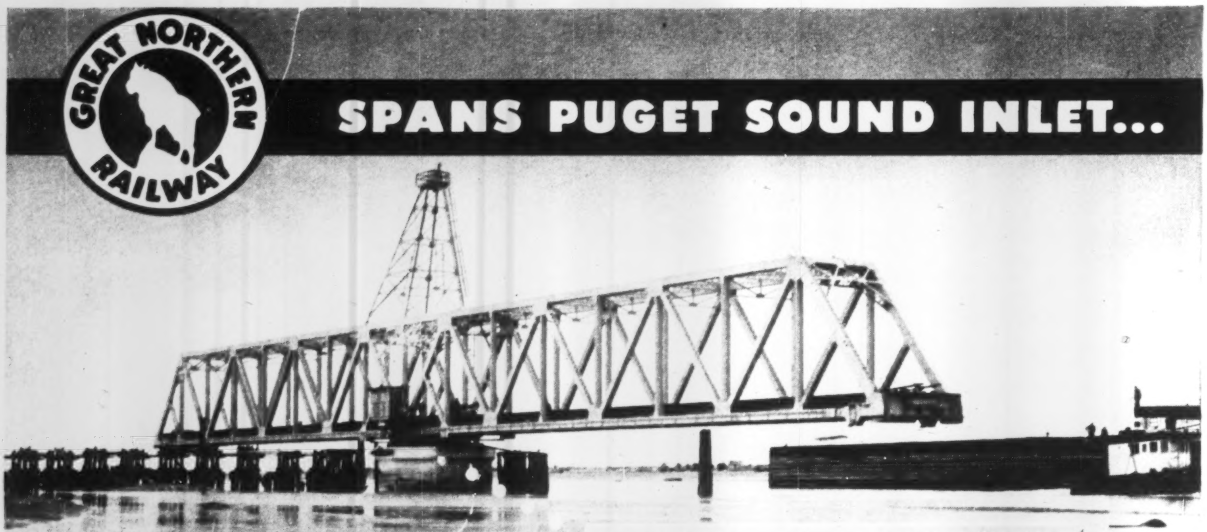
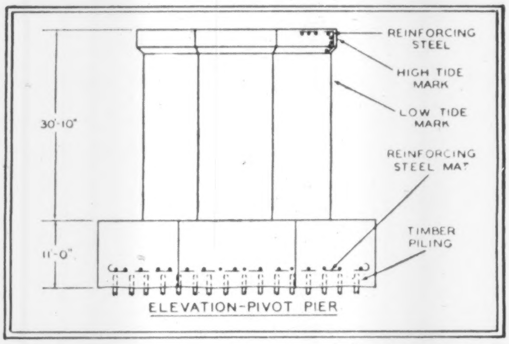


SPANS PUGET SOUND INLET...

...ON A PREPAKT PIVOT!

The completed Prepakt pivot pier prior to mounting of new 368-foot swing-type truss.



Drawing shows construction details for pivot pier of Prepakt Concrete. End pier was built in similar fashion.

In keeping with their continuing modernization program, the Great Northern Railway reconstructed its bridge over an inlet of Puget Sound at Whitmarsh, Washington, to accommodate increased rail tonnages.

A pivot pier for the bridge's new 368-foot swing-type center segment and a terminal pier were constructed by the Intrusion-Prepakt method after this modern technique of concrete placement proved simple and economical in the laying of the pivot pier's base.

Forms for the 1524 cu. yd. pivot were filled directly with coarse aggregate delivered by bottom dump rail cars. Then, highly penetrable Intrusion Mortar was pumped into the preplaced aggregate, filling all voids to form a monolithic structure having high resistance to salt water deterioration.

The use of the Prepakt method produced major economies by (1) eliminating costly, time-consuming de-watering and (2) permitting use of lighter-weight forms since no hydrostatic pressures were involved. All concrete placement was completed with the old span in place and without traffic interruptions.

Full information on this and other Prepakt structures may be had by calling or writing the Main Office, Room 779-1, Union Commerce Building, Cleveland, Ohio.

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MEN AND JOBS

Wide World photo

General Hoge to head U. S. Army in Europe

Lieut. Gen. William M. Hoge, commander of the U. S. Seventh Army in Germany who has a long Engineer Corps background, has been named Commander in Chief of the U. S. Army in Europe.

Three important "firsts" highlight General Hoge's Engineer Corps career. He headed Alcan highway construction in its early stages. Then, during World War II, he commanded a special engineer detachment, guiding port operations to supply D-Day troops assaulting Omaha Beach in Normandy. Later he led the armored troops which captured the bridge over the Rhine River at Remagen. By the end of the war, he was commanding general of the Fourth Armored Division.

His engineering career began in 1916, when he was graduated from West Point as a second lieutenant in the Engineer Corps. He served in France during World War I, then was assigned to corps offices in Kansas City, Mo.; Rock Island, Ill.; Memphis, Tenn.; Omaha, Neb., and Boston.

CE head leaves Ohio State

Prof. George E. Large, chairman of the civil engineering department at Ohio State University since 1947, has resigned to devote his full time to teaching and research in the field of reinforced concrete design.

Author of a textbook on basic reinforced concrete design, Professor Large has been active in improving design techniques and at present is continuing his work into the area of prestressed concrete. In returning to full-time teaching, he will be in charge of all civil engineering courses dealing with reinforced concrete structures. One of his aims is to develop the laboratory and experimental work of students in that field.

Prof. Kenneth W. Cosens of the civil engineering faculty has been named acting chairman of the department for the year 1953-1954.

Educators join Du Pont

Three engineering educators have joined the engineering department of the E. I. du Pont de Nemours & Co. for its "Year-in-Industry" program. They are William T. Alexander, Northeastern University; Dr. Robert M. Boarts, Jr., University of Tennessee; Dr. Albert R. Spalding, Purdue University.

The program, started two years ago by Granville M. Read, Du Pont's chief engineer (ENR, Aug. 6, 1942, p. 42), is designed to help bridge the gap between campus and industry. Under it, the educators—on a year's leave of absence from college posts—will receive their regular salaries plus normal expenses from Du Pont. They'll spend the 12 months on a schedule that takes them through the company's entire engineering organization.

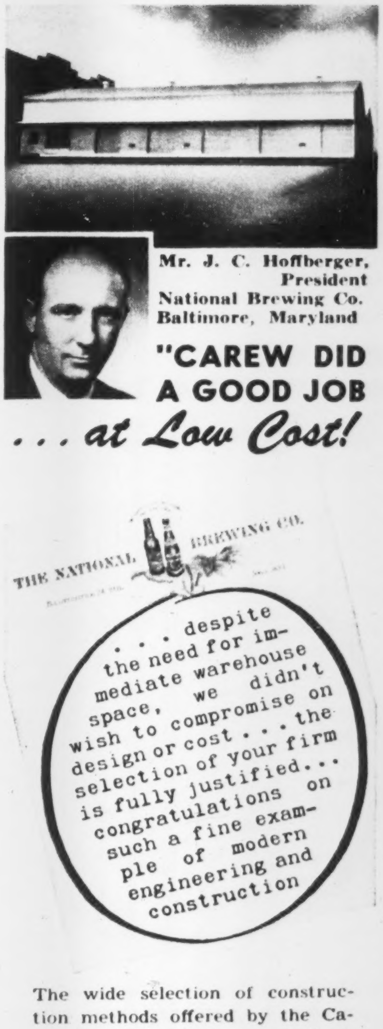
Victor M. Cone retires, Corps of Engineers expert

Climaxing a career of 37 years in federal service, Victor M. Cone, chief engineering assistant and head of the engineering division of the Nashville, Tenn., district, Corps of Engineers, retired on Aug. 31.

Cone received his civil engineering degree from the University of Kansas in 1906. Following graduation he went with the Department of Agriculture as irrigation engineer, working mainly in the headwaters of the Arkansas River. In 1929 the Memphis district of the corps requested his services to carry out the "308" surveys for the St. Francis, White and Arkansas Rivers.

Upon completion of these studies, Cone was assigned to the Mississippi River Commission in a study of a comprehensive reservoir system to control floods. Then he was retained by the Memphis district as senior engineer in charge of planning levees and other works.

In 1938, when a new division office of the corps was established at Little Rock, Ark., he was placed in charge of the engineering division. Two



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VICTOR M. CONE

years later he was loaned to the Nashville district to prepare planning reports on three large multipurpose projects on the Cumberland River and its tributaries. His permanent transfer to that district as principal engineer came in 1941.

Cone was the inventor of the original Venturi Flume (later known in modified form as the Parshall Flume) and the author of numerous bulletins on flood control, irrigation drainage, water power and navigation. His contribution to the field of hydraulics and hydrology includes supervision of construction of one of the country's first hydraulic laboratories for detailed studies in connection with weirs, flumes and evaporation.

Reclamation switch

Newcomb B. Bennett, Jr., has been moved up to director of project planning for the Bureau of Reclamation. In the switch, John W. Dixon, former chief, becomes assistant director.

This exchange of positions duplicates a similar shift in the operations and maintenance branch of the bureau. There, Floyd E. Doming moves up to become the director, and Eugene D. Eaton is appointed the new assistant director.

74 become policy makers

The Civil Service Commission has approved putting 74 Interior Department jobs under the new schedule for policy-making and confidential positions.

D. Otis Beasley, Interior Administrative Assistant Secretary, estimated that the department now will have about 100 policy-making and confidential jobs (out of a total of 58,000 department positions) completely ex-

DON'T LOSE YOUR HEAD over CHEAP [but costly] SCAFFOLDING
WHAT A FRAME!

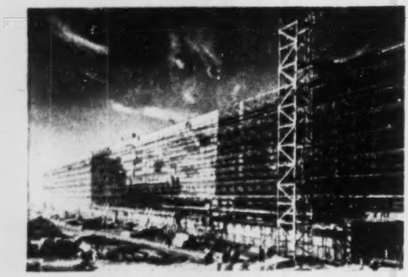
BUILD PROFITABLY and SAFELY with SAFWAY tubular steel scaffolding

IN THE LONG RUN Safway's exclusive design costs you less . . . creates greater overall profits. That's what thousands of contractors and industrial firms, painters and builders are saying today.

Safway's tubular welded frames, tubular cross braces, trouble-free wing nuts and studs give Safway scaffolding unusual strength and convenience for faster assembly.

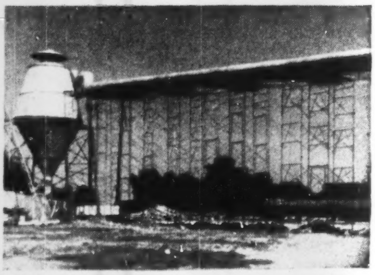
You can secure more facts by contacting one of the 137 Safway dealers near you. Or write for the fact-packed Safway bulletin. It's free.

Another Texas tall tale



It took just a year after breaking ground to deliver the first bomber at this Texas bomber plant. Miles of Safway scaffolding helped to speed the construction work.

Moving a dust collector



How would you move this dust collector when dumping space is filled? Easy! Support it with easy-to-assemble-and-dismantle Safway steel scaffolding.

Time-saver for home builders

Masons, carpenters, painters use safe, strong Safway scaffolding in home construction. Low in original cost, Safway's durable construction saves on long-run costs as well.

What's stronger than steel?

Trouble-free wing nuts solidly join tubular steel cross braces to end frames. Cross braces pivot on hardened-steel Hi-Shear rivets. All parts are corrosion and weather resistant.

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RENTED and SOLD by distributors everywhere

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work harder . . . work longer . . . work for less!

MORE POWER AT LOWER COST! You can look forward to sizeable savings on gasoline with Chevrolet trucks on the job. In heavy-duty models, the advanced Loadmaster engine with new high-compression ratio of 7.1 to 1 delivers more power than ever—and does it on less fuel! In light- and medium-duty models, Chevrolet's Thriftmaster engine combines top-notch performance, with rock-bottom operating cost.

TAILORED TO YOUR JOB! Of course you want a truck that fits the requirements of your particular job. And you get just that when you buy a Chevrolet truck! You get the *right* power . . . the *right* chassis units from tires to transmission. Chevrolet trucks are *factory-matched* to do your work at lowest cost!

RUGGED AND RELIABLE! These great 1953 Chevrolet Advance-Design trucks are built stronger to stay on your job longer! Frames, for example, are sturdier and more rigid. And you'll find extra strength in other vital places, too. The result is a truck that gives you extra miles and months of low-maintenance operation.

LOWEST PRICED LINE! You start saving money the moment you buy a Chevrolet truck. For, in addition to all its other advantages, Chevrolet is *America's lowest priced truck line!* Why not start saving *now!* Your Chevrolet Dealer will be happy to give you all the facts. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

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TWO GREAT VALVE-IN-HEAD ENGINES—the Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load. **POWER-JET CARBURETOR**—for smooth, quick acceleration response. **DIAPHRAGM SPRING CLUTCH** — for easy-action engagement. **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **HYPOID REAR AXLE**—for dependability and long life. **TORQUE-ACTION BRAKES**—on light-duty and medium-duty models and on front of heavy-duty models. **TWIN-ACTION REAR BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—for greater holding ability on heavy-duty models. **CAB SEAT**—with double deck springs for complete riding comfort. **VENTIPANES**—for improved cab ventilation. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—for easier handling. **UNIT-DESIGNED BODIES**—for greater load protection. **ADVANCE-DESIGN STYLING**—for increased comfort and modern appearance.

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in sales

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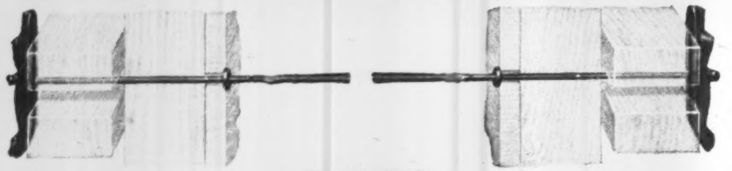
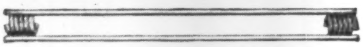
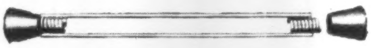


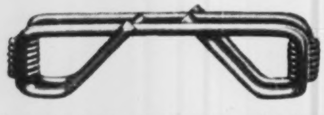
SNAP TIES



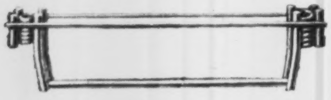
STANDARD COIL TIES



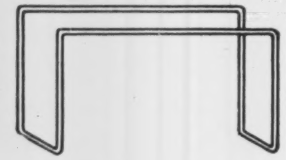
CONE-FAST COIL TIES



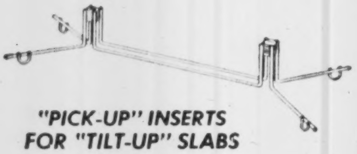
STANDARD HANGER FRAMES



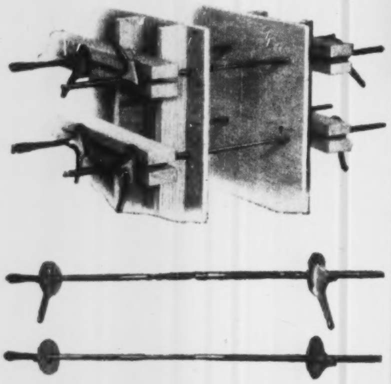
SPECIAL HANGER FRAMES



WIRE BEAM SADDLES



"PICK-UP" INSERTS
FOR "TILT-UP" SLABS



TILT LOCK CLAMPS

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Here you see several of the many various types of Form Ties, Anchors and other concrete accessories which SUPERIOR'S many years of know-how and dependability have produced to meet rigid job specifications.

Every item in the SUPERIOR line is specifically designed to provide the most efficient forming method for ordinary foundations, engineering structures, watertight walls and architectural concrete.

When you plan form work, Superior's experienced engineers are always available to prepare suggested layouts of form work as well as complete estimates and quotations. For complete details request a copy of our 56-page catalog.

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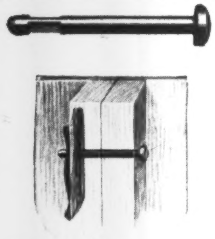
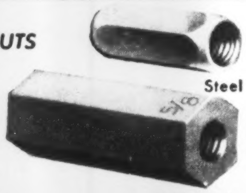


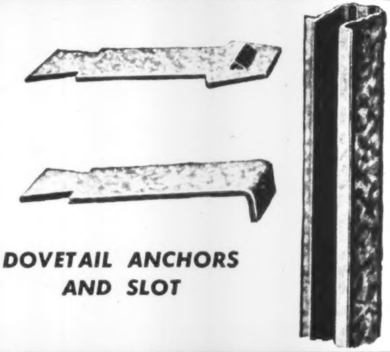
PANEL LOCK BOLTS

ADJUSTABLE SCREED CHAIRS

CONE NUTS

HEX. NUTS





DOVETAIL ANCHORS AND SLOT

SUPERIOR CONCRETE ACCESSORIES, INC.

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cluded from Civil Service protection. The 100 will include the Secretary and other Presidential appointees, as well as top officials of bureaus and offices, with their confidential aides.

Jacoby appointed an economic advisor

President Eisenhower has picked Neil H. Jacoby, California educator, to be a member of the Council of Economic Advisers.

Jacoby, who is dean of the School of Business Administration at the University of California at Los Angeles, was given a recess appointment to the post. The action is subject to Senate confirmation when Congress reconvenes in January.

The selection fills the second place on the three-man council set up to advise the President on how to keep the nation's economy on an even keel. According to James Hagerty, White House Press Secretary, a third member of the council will be named soon.

Jacoby is a specialist in finance and expects to work over the whole field of economic stabilization while serving on the council. Taxes, he says, are one of the most important instruments of stabilization.

Given overseas posts

Two Bureau of Reclamation engineers have been assigned to foreign missions under the Foreign Operations Administration.

George F. Stacey, formerly location engineer on the Columbia Basin project, will be stationed in Asmara, Eritrea, where a team of engineers is helping to develop potential agricultural land through irrigation.

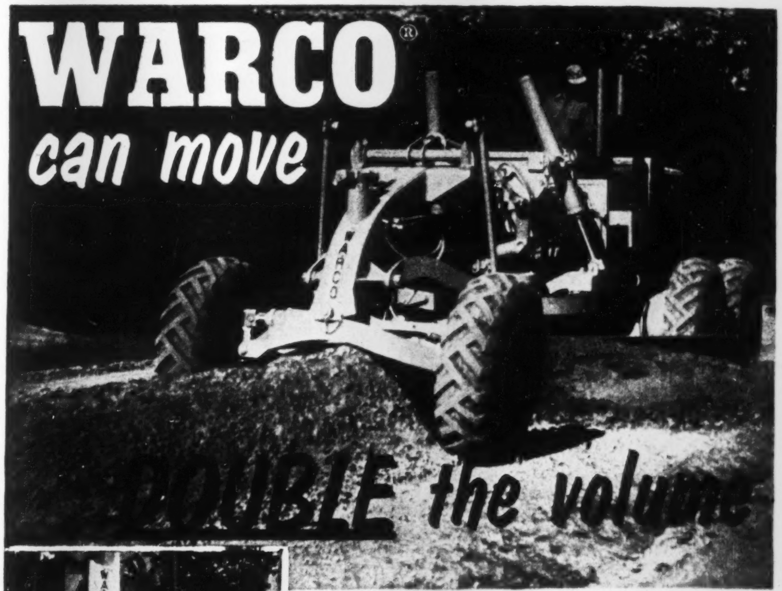
Frank Tessitor has been assigned to Pakistan as an adviser on the establishment of an engineering laboratory, which will be used for soils and materials testing in connection with the development of water resources. Since 1941, Tessitor has headed the metals and machinery testing group in the chief engineer's office at Denver, Colo.

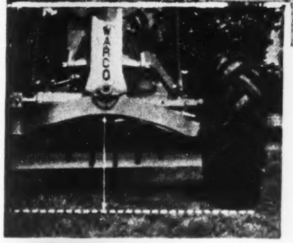
Change in Calif.

Warren T. Hannum has retired as California director of natural resources after nine years of service. He also was chairman of the state water pollution control board.

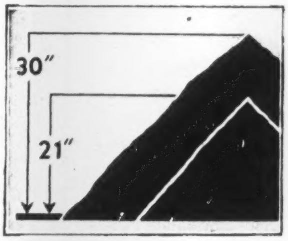
A M Rawn, chief engineer and general manager of the Los Angeles County Sanitation District, will succeed Hannum as chairman of the state water pollution control board.

Hannum took the state job in Feb-





30" clearance of WARCO high-arched front end . . . 21" is median clearance of all other graders.



There's *double the volume* in the WARCO-cleared 30" windrow, as compared with the average grader's clearance of a median 21" windrow.

NOTE: FIGURES ARE FOR 100 H. P. CLASS, 85 H. P. CLASS 1" LESS

WARCO . . . the only motor grader whose extra front-axle clearance permits moving up to double the volume . . . prevents bull-dozing, eliminates power loss. You can use this WARCO extra work capacity to keep every job way ahead . . . in time saved and profit earned.

WARCO the only motor grader whose blade . . . entirely cab-controlled . . . reaches every working position without manual adjustment . . . even up to 90° on either side.

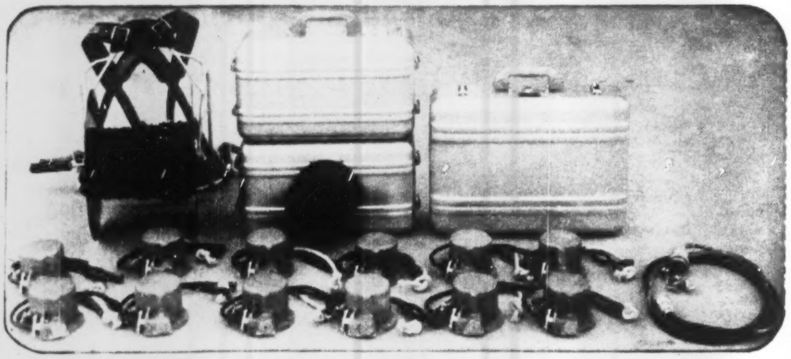
Model 4D-100 Heavy Duty 100 H. P.
Model 4D-85 General Duty 85 H. P., extra power for heavier loads.

W. A. RIDDELL Corporation
BUCYRUS OHIO
Builders of WARCO Motor Graders and HERCULES Road Rollers

HOW DO *YOU* FIND BEDROCK?

THERE IS AN EASIER WAY

with CENTURY CONSTRUCTION SEISMOGRAPH



Now you can locate bedrock and plot its contour in minutes instead of hours. To learn more about this new and PROVEN method of bedrock finding without detailed and costly drilling, write 1333 *North Utica*

Century GEOPHYSICAL CORPORATION
TULSA, OKLAHOMA
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ruary, 1944, after retiring as brigadier general in the Corps of Engineers. His last post was in San Francisco where—as head of the corps' Pacific division—he was in charge of construction and maintenance of rivers and harbors, and flood control work, and construction of military installations west of the Rockies.

State Forester DeWitt Nelson will take over as director of natural resources.

Careers . . .

• **Government appointments** — Dr. **John E. Vance,** head of the chemistry department at New York University, has been named deputy chief of research and development and chief scientist of the Department of the Army. He succeeds **Dr. Harold V. Gaskill,** who returned to Iowa State College as dean of science. . . . **Jerome van de Erve,** Eastern area hydrologic engineer with the U. S. Weather Bureau, has been transferred to Sacramento, Calif., as Western area hydrologic engineer. He replaces **Vernon W. Rupp,** who resigned to enter private business. . . . Two executive changes have been made by the Army Engineers in the Missouri Basin. **Col. Keith R. Barney,** executive officer for military construction in the office of the Chief of Engineers, has been named district engineer of the Kansas City District. He succeeds **Col. L. J. Lincoln,** who is attending the Army War College. **John W. Sibert, Jr.,** has been named area engineer in charge of building Oahe Dam.

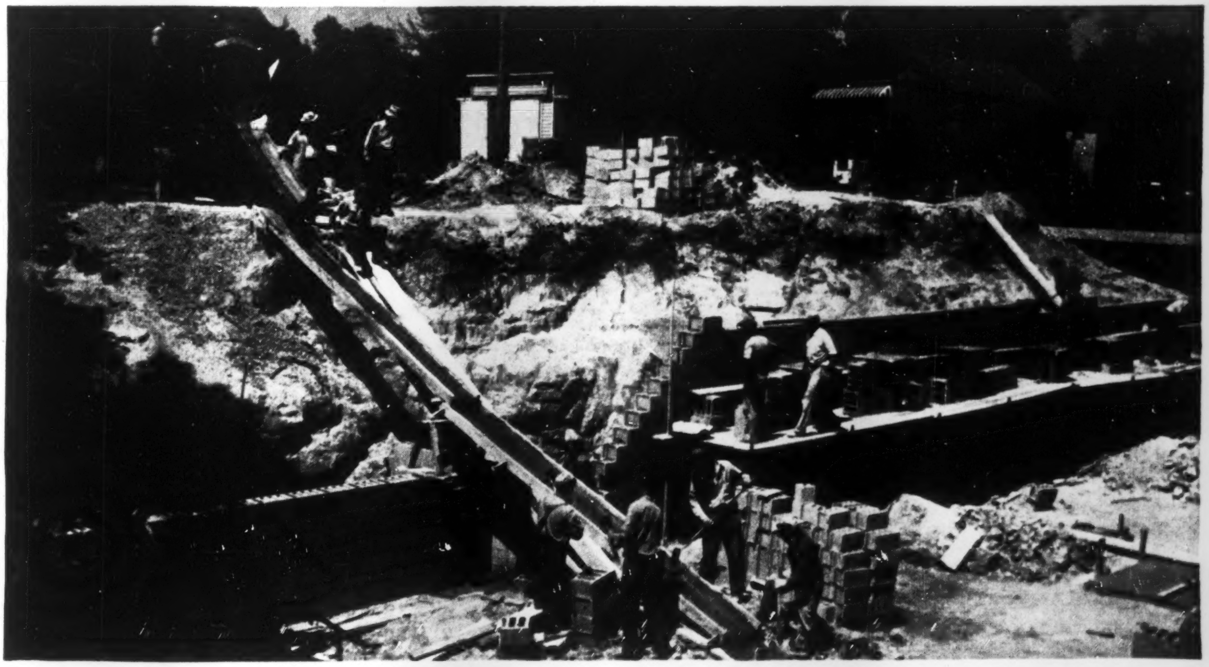
• **Local government appointments** — **Harold L. Jacobs,** with the pollution abatement department of E. I. du-Pont de Nemours & Co., has been reappointed to the Delaware Water Pollution Commission by Gov. J. Caleb Boggs. . . . **Jack Sleavin** has been named city engineer of Aberdeen, Wash., to succeed **L. E. Hough,** who entered private engineering practice. . . . **Mose E. Cox,** engineer-secretary of Atlanta's expressway project, has been appointed by Gov. Herman Talmadge to the Georgia state board of regulations for professional engineers and land surveyors. He replaces **M. T. Singleton,** resigned. . . . **Marshall Jones** has been named city engineer of Oroville, Calif. He was manager of the Bureau of Reclamation's Chico, Calif., district office.

• **Changes—Percy L. Coleman** has resigned as senior structural engineer with Sverdrup and Parcel, Inc., consulting engineers of St. Louis, Mo., to

DOW

INCREASE THE WORKABILITY AND DENSITY OF YOUR CONCRETE

DOWFLAKE provides a high degree of plasticity that allows concrete to flow easily



You can increase the workability of your concrete 40% by adding Dowflake® (Dow calcium chloride 77-80%). Because Dowflake improves plasticity of concrete, you get a better, more thorough job and save labor costs at the same time.

Consider how your operation will benefit by using Dowflake. Wherever it is necessary to convey concrete by chute, the concrete flows rapidly, requires little hand labor to keep it moving at turns or blockades. The mixer and chutes require much less cleaning after the job is completed.

When your job requires pouring into forms, a Dowflake admixture assures an even flow and a *complete fill.* It eliminates the greater part of voids in corners and on surfaces where adhesion to forms causes pockets in ordinary mixes. When the forms are removed you will find a smoother, better appearing, more uniform surface that requires a minimum of pointing up.

The greater plasticity of the mix, induced by Dowflake, makes it possible to decrease the amount of water which would otherwise be necessary to make the concrete flow. This reduction in gauging water reduces shrinkage and surface crazing and provides a denser, more waterproof concrete.

In addition to these benefits Dowflake provides faster set, more uniform and dependable curing and higher strength at all ages. Assure yourself of increased efficiency and productivity by taking advantage of the many benefits Dowflake provides. Your nearest Dowflake distributor can give you complete information and assistance. Contact him today. THE DOW CHEMICAL COMPANY, Midland, Michigan.

you can depend on DOW CHEMICALS DOW

Give your employees another safety plus — install Hendrick Shur-Site Treads for stairs and fire escapes. You cut down accident rates and improve working conditions with Hendrick treads because they afford a non-slipping, level walking surface — have 90% open area, do not obstruct light and ventilation.

CLIMB *in confidence . . .*

A safety-first, heavy flanged nosing-bar provides extra reinforcement and plainly marks the edge of each step. Bars are square edged, uniformly spaced for long, sustained life.

Ready to bolt directly to stair stringers, they're furnished in standard sizes or in special widths and lengths to meet specific requirements. For more complete data write Hendrick direct.

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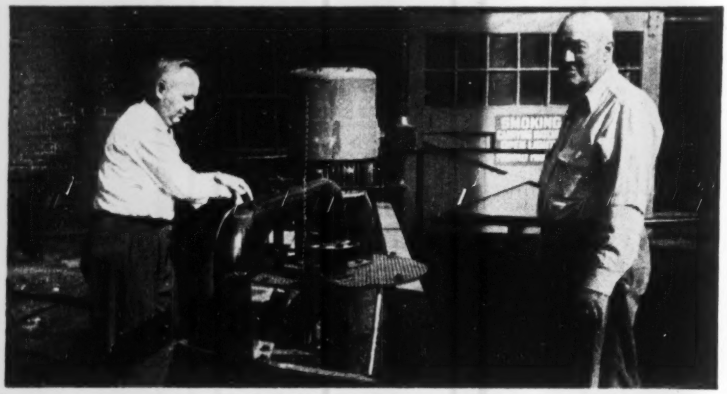


Pumping Hot Tar and Water

At the Delaware Power & Light Co., Wilmington, Delaware, the Deming Vertical Sump Pump, illustrated, is proving its dependable performance.

This unit (Fig. 4620) pumps hot tar and water from a sump through 275 feet of 6" pipe, then up 20 feet into a gas holder tank. The pump is equipped with an explosion proof motor.

Other Deming Pumps used at this plant include four Fig. 4701 "MINUTURB" turbine pumps, two of which are used for pumping condensate from gas mains. For complete information on Deming Pumps write:

THE DEMING COMPANY
536 Broadway • Salem, Ohio

DEMING PUMPS

MEN AND JOBS

become a consulting engineer. . . . **Raymond L. Brandes** has rejoined Nicholson Co., Inc., in New York City as vice-president and chief engineer, and its parent company Wininger Construction Corp. as chief engineer. He was with W. J. Barney Construction Corp. in New York. . . **Terry J. Owens,** former Denver city engineer, has joined the Automotive Safety Foundation in Washington, D. C., as urban highway engineer. . . . **Carroll L. Mann, Jr.,** of the Greensboro, N. C., engineering and architectural firm of Mann and McLawhorn, has been appointed professor of civil engineering at North Carolina State College. He will teach in the construction program. . .. **John F. Kerwin** has been promoted to engineer of design for the Boston & Maine Railroad, succeeding **John P. Cronin,** who retired. Other changes in the company: **James J. Winn** has been named division engineer with headquarters at Dover, N. H.; **Thomas K. Dyer** becomes assistant division engineer at the Boston terminal; **Everett A. Armstrong** is now assistant structural engineer. . . . **Gerald E. Hauer** has been elected vice-president in charge of engineering for American Well Works, Chicago and Aurora, Ill., manufacturing company. . . . Baltimore Contractors, Inc., has named **A. H. Levine** a director. He is vice-president in charge of operations. . . . **G. M. C. Lucas** has joined Layne Atlantic Co. of Orlando, Fla., as sales engineer. He will work with the firm's water treatment division in the Atlantic Seaboard area.

• **Elected—Thomas A. Able, Jr.,** has been elected president of the Piedmont chapter of South Carolina Professional Engineers. **H. E. Glenn** was named vice-president; **Thomas P. Grimball,** secretary-treasurer; **Raymond L. Champoux;** director; **J. Wesley Lewis,** state representative.

• **Resigned—Richard A. Haber** has resigned as consultant to Col. William A. McWilliams, chief engineer of the Delaware State highway department.

• **Retired—Charles F. Carter** has retired as design architect in the Navy Bureau of Yards and Docks, after nearly 19 year's service. . . . **Chester A. Burn** has retired as assistant state highway engineer for the New Jersey state highway department . . . **E. J. Marsten** has retired as engineer in the erection department of Bethlehem Steel Co., Bethlehem, Pa. For more than 50 years he has been active in structural steel design, fabrication and erection.

BOOKS

Major toll-road study

TOLL ROAD DEVELOPMENTS AND THEIR SIGNIFICANCE IN THE PROVISION OF EXPRESSWAYS—By Harmer E. Davis, Ralph A Moyer, Norman Kennedy and Howard S. Lapin. Institutes of Transportation and Traffic Engineering, University of California, Berkeley, Calif. Limited free distribution.

This study by the Institute of Transportation and Traffic Engineering is the most complete assembly of information yet published relating to all toll roads built in this country. In addition to giving basic data such as length, cost, toll rates and the cost of collecting tolls for all the major toll roads now in operation, there also is a review of the factors back of the resort to toll financing for each project.

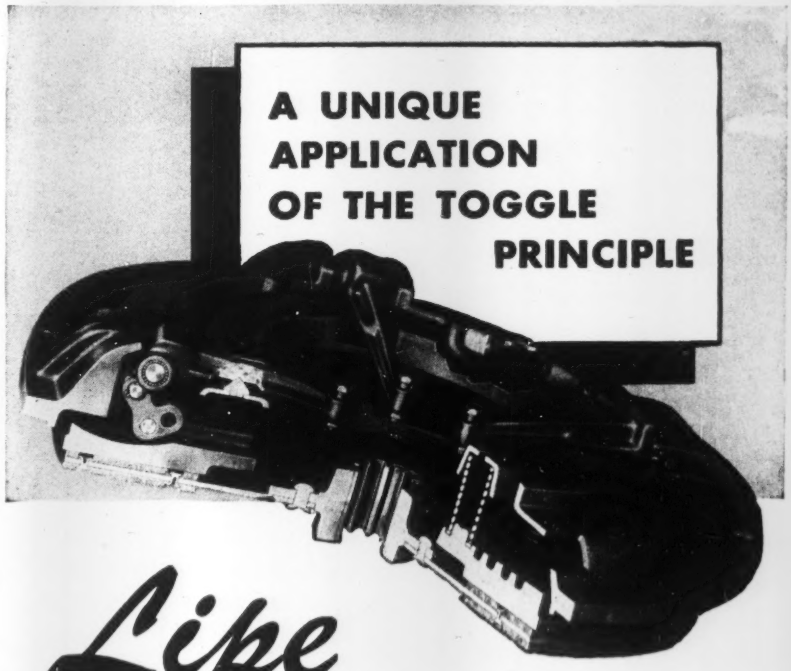
The authors state that they have not attempted to give detailed consideration to the public policy aspects of toll roads as they were discussed in the Owen and Deering report "Toll Roads and the Problem of Highway Modernization." Nevertheless, the authors do make pertinent comment on policy questions in their conclusions. For example, they note the inconsistency of not permitting federal-aid highway funds to be used to build toll roads when, presumably, the federal interest in such roads is higher than in most free highways on which federal money can be spent.

The authors conclude that toll roads are fulfilling a real need. They raise question as to whether all could stand the test of a serious business depression, and they point to the danger that people, generally, will accept them as a panacea for highway finance problems and so neglect to adjust support for the general road system to the new price levels dictated by economic growth.

Specification writing

SPECIFICATIONS—By H. Griffith Edwards. 311 pp. D. Van Nostrand Co., 250 Fourth Ave., New York. $5.00

Here is a book that architects and builders should find helpful in the writing of specifications. Not only does it present specifications for various building constructions that can be used as a guide in writing new specifications but it also analyzes the written requirements themselves. As a result, the author, a member of the staff of the Georgia Tech School of Agriculture, is able to point out where



A UNIQUE
APPLICATION
OF THE TOGGLE
PRINCIPLE

Lipe

CONSTANT-CAPACITY CLUTCH

Based on a unique application of the toggle principle, this LIPE constant-capacity CLUTCH compensates for wear of friction material . . . compensates for fading pressure of expanding springs . . . never loses torque capacity while there is a reasonable amount of friction material left to hold. The constantly increasing leverage of the toggle — which never goes over center—builds up pressure in almost direct ratio to these losses.

Toggle Action Insures Smooth Engagement

Despite its multiple pressure action and positive drive, the engagement of this clutch is gentle and chatter free. This is due (1) to the fact that the initial energy of the springs is partly absorbed by the toggles, and (2) to the fact that the rate of engagement is slowed by the reduced speed of the toggle as it approaches center.

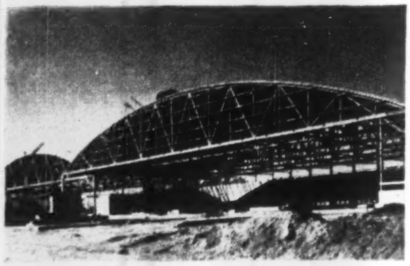
High thermal efficiency is assured by a massive plate, ribbed for faster radiation, and cooled by positively generated air currents.

It's a clutch that is bound to change your ideas about clutch design, capacity and service. Write for specifications and performance data.

LIPE ROLLWAY
Lipe-ROLLWAY CORPORATION
Manufacturers of Automotive Clutches and Machine Tools
Syracuse 1, N. Y.

WE'VE BEEN GROUNDED! WE CAN'T HANG AROUND THIS MINALITH FLAME-PROOFED HANGAR . . .
TERMITE
ROT

Two views of Westchester County's new airport hangars. Fire can't spread to the roof structure because Minalith-treated wood in columns and braces won't carry flame.



How MINALITH* protects these record-spanning airport hangars

New York's Westchester County has some interesting new hangars in its airport. The clear span of each of the bays is 250 feet . . . the world's clear-span record for wooden structures. This figure exceeds by 12 feet a blimp hangar's previous record of a 238-foot clear span.

And equally interesting is the built-in method of fire protection for these immense wooden structures. As a sure means of preventing a possible fire from spreading upward to the roof, all wood below the bottom chord of the arches, including the laminated timber columns, was pressure-impregnated with fire-retarding Minalith.

Listed by Underwriters' Laboratories, Minalith also meets Federal specifications for fire retardants. Wood treated with Minalith will not support combustion . . . it will char slowly where flame touches it, but will not ignite. During a fire, Minalith-treated lumber maintains its load-bearing strength without sudden collapse. As a plus-value, Minalith also protects wood from decay organisms and insect attack. And Minalith has no undesirable effects on lumber, keeping it clean for handling and completely paintable.

Minalith-treated lumber is a product of American Lumber and Treating Company, who also produces Wolmanized* preservative-treated lumber. There are Minalith and Wolman treatment plants in all parts of the country. For further information write:

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Producers of the Original

MINALITH ***FLAME PROOFED LUMBER*** **a companion product to Wolmanized** PRESSURE TREATED Lumber

* Reg. U. S. Pat. Off.

unnecessary verbiage can be eliminated, stilted expression made easier to read and vague clauses clarified.

The book is by no means a comprehensive treatise; it is intended principally as a text for students and a primer for the guidance of young architects and hence does not cover all facets of construction. Divided into two parts, it presents general aspects of specification writing in the first ten chapters. The second part deals with the "General Conditions" and specifisc trades as related to specification writing for non-fireproof types of construction, such as a frame residence. The author believes that the fundamental principles presented there can be applied to larger jobs.

Miscellaneous notes

- **Two booklets** covering different phases of the ever-increasing traffic problem have been issued recently. The first—"Parking Meters" (their number, revenue and use) issued by the American Municipal Association, 1313 East 60th St., Chicago, Ill. ($2.00). It is a report of a joint study by that association, the Highway Research Board and the Bureau of Public Roads. The report covers the history, trends and various purposes of parking meters. Included also are tables showing revenues and rates of fines for violators. Advertising on meters is also covered. The second booklet—"Zoning and Traffic," issued by the Eno Foundation for Highway Traffic Control, Saugatuck, Conn.—is devoted to use of zoning to control parking areas, loading and unloading areas, roadside signs and general land use (with emphasis on traffic). Tables show what cities are at present doing on these matters.

- **Copies** of the newly revised model Fire Prevention Code published by the National Board of Fire Underwriters may be obtained free by writing the board at 85 John St., New York 38, N. Y. Interested persons or committees considering local codes also can acquire copies from the board's other regional offices: in the Middle West, 222 West Adams St., Chicago 6, Ill.; west of the Rockies, 465 California St., San Francisco 4, Calif.

The code indicates the necessary safeguards a modern community must take to protect life and property from fire hazards and explosions due to storage, handling and use of flammable liquids and gases; chemicals and explosives; plastics, dust and fumigants. In addition, it recommends measures against dangerous conditions found in garages, bowling alleys, junk yards and places of public assembly.

• **Recommendations** of the Federal Civil Defense Administration for shelter construction are given in an 86-page manual, TM5-5, "Home Shelters for Family Protection in an Atomic Attack." The designs were tested earlier this year at the Atomic Energy Commission's Proving Grounds in Nevada (ENR March 26, p. 23). According to the FCDA, shelters can be built for as low as $10 per person, but they are intended for occupation only for short periods of time. The manual can be obtained for 30 cents from the Superintendent of Documents, Washington 25, D. C.

New engineering books

BASIC MECHANICS OF FLUIDS—By Hunter Rouse. 245 pp. John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. $4.50.

SURVEYING THEORY AND PRACTICE—Fourth Edition—By Raymond E. Davis and Francis S. Foote. 1021 pp. McGraw-

ADVENTURES, A Life Story—By W. F. Durand. 212 pp. The American Society of Mechanical Engineers and McGraw-Hill Book Co., 330 West 42nd St., New York 36, N. Y. $4.00.

TOWN DESIGN—By Frederick Gibberd. 300 pp. Reinhold Publishing Corp., 330 W. 42nd St., New York 36, N. Y. $15.00.

Reports and pamphlets

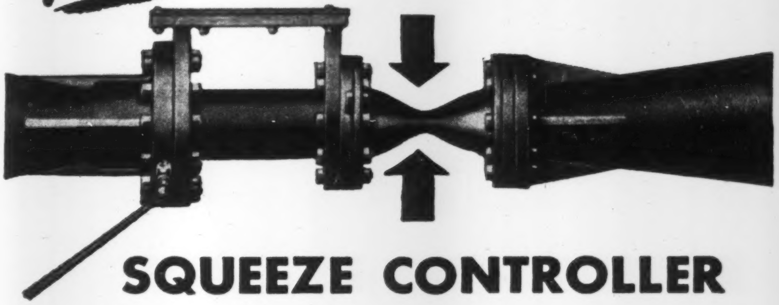
BUILDING RESEARCH IN CANADA—A Progress Report. The Division of Building Research, National Research Council, Ottawa, $1.00 for four copies.

THE INERT GAS-SHIELDED METAL-ARC WELDING PROCESS—American Welding Society, 33 W. 39th St., New York 20, N. Y. $1.00.

METHODS AND PROBLEMS OF FLOOD CONTROL IN ASIA AND THE FAR EAST—Bureau of Flood Control, Economic Commission For Asia And The Far East, Bangkok, Thailand. $1.15.

UNIFIED SOIL CLASSIFICATIONS SYSTEM—Technical Memorandum No. 3-357 ($1.00); Appendix A, Characteristics of Soil Groups Pertaining to Embankments and Foundations ($0.50); Appendix B, Characteristics of Soil Groups Pertaining to Roads and Airfields ($0.50). Waterways Experiment Station, Vicksburg, Miss.

TESTS OF BLENDS OF PORTLAND CEMENT WITH MASONRY CEMENT—Technical Memorandum No. 6-359. Waterways Experiment Station, Vicksburg, Miss. $1.00.



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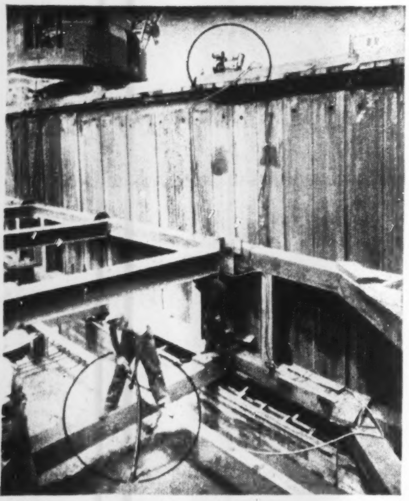

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LEGAL

Ignorance of contract terms

Where a party to a written contract accepts it as a contract, he is bound by the stipulations and conditions contained therein whether or not he has read the contract and is familiar with its contents.

"Ignorance through negligence will not relieve a party from his contract obligations. He who signs or accepts a written contract, in the absence of fraud or other wrongful act on the part of another contracting party, is conclusively presumed to know its contents and to assent to them, and there can be no evidence for the jury as to his understanding of its terms."[1]

(1) Level Export Corp. v. Wolz, Aiken Co., 305 N.Y. 82, 111 N.E. 2d 218.

Architect's compensation

An architect was employed to prepare plans and specifications for remodeling and repairing certain school buildings. The school board of the community for which the work was to be done had passed a resolution providing that the architect's compensation was to be 8 percent on "all work approved and let." The resolution also provided that the board reserved the right to disconitnue any or all of the work at any time the school interests required and in that event the compensation of the architect would be determined by the schedule established by the American Institute of Architects.

The board of education did not let any contracts for the proposed work and refused to pay the architect any compensation for the services rendered by him in preparing the plans and specifications for the contemplated work, claiming that since no contracts for the work were let, the architect was not entitled to any compensation. The architect then brought an action to recover for said services and was allowed a recovery.[1]

The court held that the schedule of compensation for services established by the American Institute of Architects provided: "Upon the completion of the preliminary drawings, a sum equal to 20% of the basic rate computed upon a reasonable estimated cost. Upon completion of specifications and general working drawings (exclusive of details) a sum sufficient to increase payments on the fee to 60% of the rate or rates of commission agreed upon, computed upon reasonable cost estimated on such completed specifications and drawings, or if bids have been received, then computed upon the lowest bona fide bid or bids."

The court in its opinion stated: "The reasonable interpretation of the contract is, we think, that, if the work was done under the supervision of the architect, he was to have a fee of 8% of the cost of all the work, but, in the event appellant decided to abandon or discontinue the work, he was to be compensated according to the schedule of the American Institute of Architects, and the amount judgment was rendered for was in accordance with that schedule. While no contract was ever let, bids were received, and the compensation for which judgment was rendered was upon the lowest bid made for doing the work."

(1) Llewellyn v Board of Education of Cicero-Stickney High School Tp. Dist., 154 N.E. 889, 324 Ill. 254.

Items not in subcontract

"If a general contractor chooses to split up his contract into separate items and subcontract those items, it would seem fundamental and common sense that, if he fails to subcontract and specify all the items included in the general contract, such items as he omits to specify in his subcontracts he must take care of himself.

"A mere reference to the general contract and the provision in the subcontract that the subcontractor is to be bound by the terms, plans, and specifications of the general contract cannot enlarge the terms or conditions of the subcontract which by its terms is limited to certain definite and specific items at a specified unit price per unit of quantity."[1]

In the above case the general contractor for a road job subcontracted certain definite items of work to a subcontractor, the work to be performed on a unit price basis. Upon the refusal of the subcontractor to do certain work not specified in the subcontract and for which no unit price was fixed, the general contractor did the work and then brought the action against the subcontractor to recover the cost of performing same. The trial court allowed the general contractor a recovery but this judgment was reversed on appeal.

(1) Inland Eng. & Const. Co. v. Maryland Casualty Co., et al., 290 P. 367, 76 Utah 435.

(These summaries of court decisions are prepared by I. Vernon Werbin, New York attorney and civil engineer.)

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Steel framework for new plant addition at
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OSSIAN P. WARD,
Louisville, Kentucky: Architect
STRUCK CONSTRUCTION COMPANY,
Louisville, Kentucky: General Contractors
McKINNEY CONSTRUCTION COMPANY, INC.,
Louisville, Kentucky: Erectors
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All Structural Steel

Meeting the construction schedule for this plant-expansion project left no margin for delay. Because meeting demands for their fine tobacco products—hitting new highs saleswise month after month—made an immediate increase of productive facilities a "must" for Brown & Williamson Tobacco Corporation.

That in turn demanded delivery on-the-double of structural steel. And that's International's *specialty!* Each shipment of the 340-ton order was on the job, timed to meet erection deadlines. Each reached its destination in good order, exactly as ordered. Within two weeks after International's first delivery, this big tobacco plant was growing . . . *fast!*

Quick, accurate fulfillment of structural steel contracts . . . with economy always a prime consideration . . . is one of many steel fabrication services offered you by International. So, whatever your needs or however tough your particular problem, write and tell us the details. No obligation, of course.

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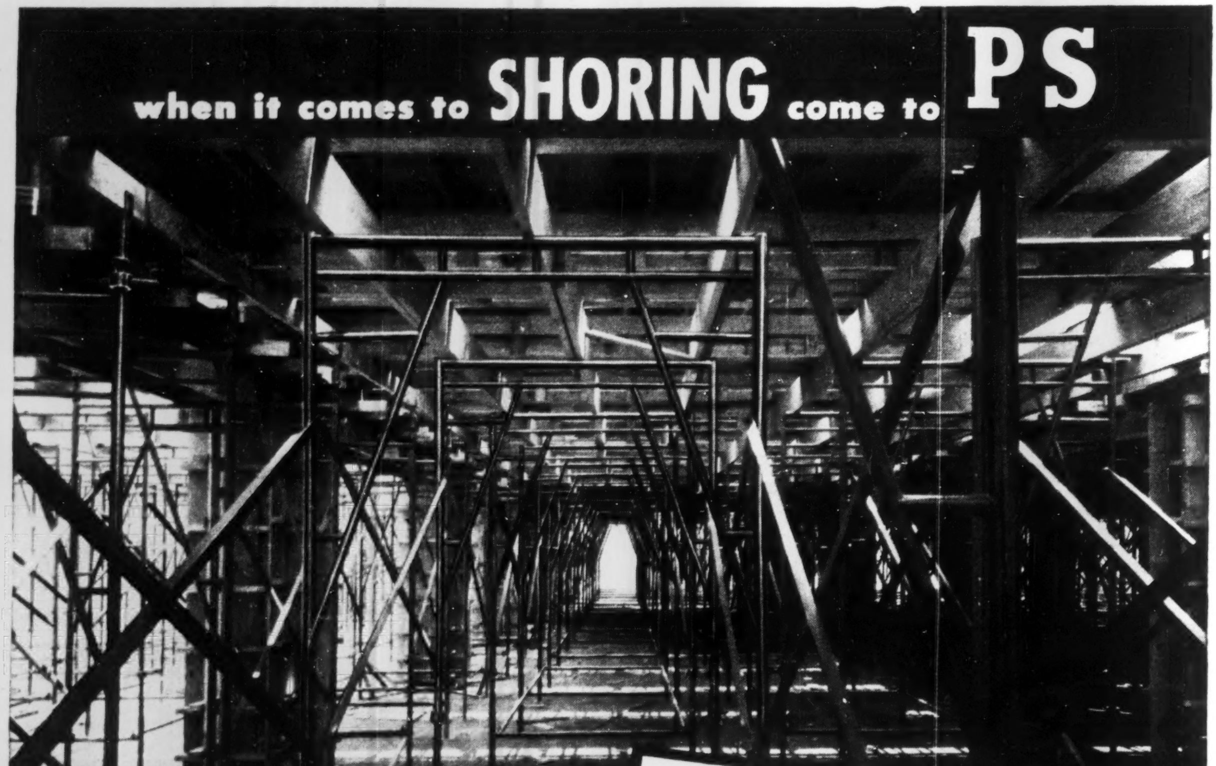

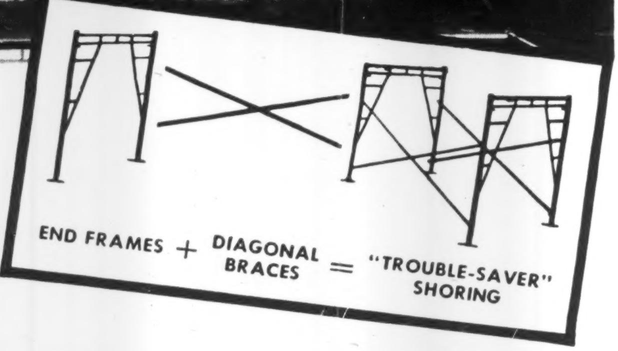

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MATERIALS AND LABOR PRICES

Market quotations on construction materials and wage rates reported monthly by ENR correspondents
November Materials, and Labor Prices will appear in November 5, 1953 issue

CEMENT, AGGREGATE, READY-MIXED CONCRETE—F. O. B. CITY

	PORTLAND CEMENT* Per bbl. C/L lots cash. dis. not deducted			SAND AND GRAVEL Per ton. carload lots			CRUSHED STONE Per ton. carload lots		CRUSHED SLAG Per ton. carload lots, f.o.b. plant		CONCRETE BLOCK 8 x 8 x 16-in.; truckload del.; per block		CONCRETE Ready Mixed 1:2:4, over. 50 c.y., del.
	Paper	Bulk	Mortar	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	Sand grav.	Lt. wgt. agg.	
Atlanta	$3.87	$3.56	3.40	$2.075	$2.075	$1.83	$2.20	$2.20	$1.87	$1.99	$0.21	$0.21	$12.06
Baltimore	3.90	3.60	3.53	2.50‡a	2.50‡a	2.00‡a	2.70‡a	2.80‡a	2.60‡a	2.55‡a	.17	.17a	11.45
Birmingham	3.26	2.60•	....	2.53n	2.53n	2.23n	2.64	2.64	1.25	1.45	.165	.165	11.00
Boston	4.16	3.84	3.96	2.50a	2.50a	2.50a	1.50a	1.60a	....	....	.215	.245a	12.00h
Chicago	3.48	3.17	...	3.25‡b	3.25‡b	3.65‡b	3.25‡b	3.25‡b	2.25‡	2.25‡	.23	.23b	11.70/11.94
Cincinnati	3.76	3.55	3.55	2.19‡c	2.24‡c	2.24‡c	2.54‡•	2.54‡•	....	....	.21	.225a	10.95
Cleveland	N. A. in C. L.	3.02•	....	2.05ef	1.85f	1.65	4.10a	4.10a	3.35‡	3.15‡	....	.24	14.40d
Dallas	3.15	2.85	2.90	2.18	2.28	1.84	2.22	2.38	...	....	.11e	.2675	9.40
Denver	4.04	3.74	4.04	1.80	2.00	1.20	....	....	...	....	.23	.255a	10.50
Detroit	3.77	3.50	3.57	4.25‡b	4.25‡b	3.75‡b	4.50‡	4.50‡	4.50‡	4.50‡	.21	.22a	12.00j
Kansas City	3.42	3.12	3.20	1.85‡	1.85‡	1.50‡a	2.00‡a	2.00‡a	....	....	.20ag	.215e	12.00b
Los Angeles	4.52a	4.00a	5.00	2.11a	2.31a	2.06a	2.06a	2.16a	....	....	.135fm	.237m	11.71lh
Minneapolis	3.95d	3.64d	3.56	2.55‡ag	2.55‡ag	1.50‡ag	2.75‡ag	2.75‡ag	....	....	.21ik	....	12.25f
Montreal	3.16ac	2.96ac	....	3.00	3.00	2.25	1.40ij	1.40ij	....	....	.20	.20a	11.10k
New Orleans	3.35	3.02	3.18	2.32	2.32	1.82	....	....	1.05	1.25	.25	....	12.90
New York	4.01	3.70	3.53	2.75bk	2.75bk	1.80bk	2.70bl	2.70bl	....	....	....	....	13.55an
Philadelphia	3.58/3.97‡	3.27/3.64‡	3.58/3.63‡	2.75‡••	2.75‡••	2.15‡••	2.30‡	2.40‡	2.00	1.90	.22/.26	....	12.50d•
Pittsburgh	3.47	3.19	3.47	2.25‡	2.25‡	2.20‡	2.60‡	2.60‡	2.15	2.15	.22d	.22d	13.00
St. Louis	3.42/3.63b	2.99/3.25b	3.25/3.42	3.10am	2.90am	2.50/2.90am	1.70j	1.70j	1.50	1.50	22	.28ci	11.40
San Francisco	3.56	3.16	....	1.92	1.92	2.02	2.02	2.02	....	....	....	.27cl	11.25c
Seattle	4.65a	3.35a	5.80h	3.00‡bm	3.00‡bm	3.00‡bm	3.50‡bm	3.50‡bm	....	....	.25j	.3325j	11.40j

‡Delivered. * Prices incl. dealers discount except as noted.
CEMENT: a Subj. to 10¢ dis. b Less 2% for cash. c CL price dealers discount not incl. d Dealers sell only LCL. •Truckload lots, destination price. h LCL.
SAND, GRAVEL, STONE & SLAG: a Truck lots. b Per cu. yd. c 5 tons or more. e ½". f Pea gravel. g Less 5% for cash. h Less than 5 tons. i Sales tax incl. j F.o.b. quarry. k Barge lots asd. l F.o.b. scow Hudson river. m Less 2% for cash. n F.o.b. cars. • 1-3 mi zone. • Add 10¢ for ea. add'l 3-mi zone

CONCRETE BLOCK: a Cinder. b Waylite. c Haydite. d Celocrete. e 5½ x 8 x 12 in. f 8 x 4 x 16. g F.o.b. truck at job. i Less 2% for cash. j Less 1% for cash. k 8x8x18. l F.o.b. plant San Rafael. m F.o.b. yard.
READY MIXED CONCRETE: a 5 cu. yds. or over del. Man. b 25 cu. yds. or more. • 10–100 cu. brackets. d 1–3 mi. zone. e 2,000 lb concr. f 2500 lb. comp. h Less 50¢ for cash. i 5% off for cash. j 2% off for cash. k Sales tax included. l 1:2½:4. m F.o.b. yard. n Plus escalator clause. •Add 15¢ for ea. add'l 3-mi zone

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	Bulk		Bulk		Bulk		Bulk		Bulk
Richard City Tenn	**$2.75†**	**Buffington, Ind.**	$2.70†	Steelton, Minn	$2.80†	Muskegon, Mich	$2.85†	Toledo, O	$2.75†
Clinchfield, Ga	2.75†	Independence, Kan	2.65†	Leeds, Ala	2.60†	Saginaw, Mich	2.75†	Milwaukee, Wis	2.90†
Kingsport, Tenn	2.75†	Hannibal, Mo	2.70†	Duluth Minn	2.80†	Wyandotte, Mich	2.75†	Green Bay, Wis	2.90†
West Des Moines, Iowa	2.80†	Northampton, Pa	2.75†	Hudson, N. Y	2.75†	Buffalo, N. Y	2.75†	Ironton, O	2.75†
Nazareth, Pa	2.75†	Universal, Pa	2.80†	Alpena, Mich	2.65†	Oswego, N. Y	2.90†	Montreal ity	2.66
Bath, Pa	2.75†	Waco, Tex. (+ 10¢ tax)	2.60†	Detroit, Mich	2.75†	Cleveland, O	2.75†	W. Winfield, Pa	2.80†

† *Prices to hold for fourth quarter of* 1953.

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	PAVING BRICK AND BLOCK			PAVING ASPHALT Per ton, less than 80 penetration		ASPHALT BINDERS—FLUXES Per gal., 80–300 penetration		CUTBACK ASPHALT Per ton		ROAD OIL Per gal.	ASPHALT EMULSION (Quick-breaking) Per gal.	
	Granite Per M lots of 50,000 4x4x8 in.	Brick per M 3x4x8½ in. carload lots	Wood per sq. yd. 3½ in. 16-lb. treat	Tank car	Drums	Tank car	Drums	Tank car	Drums	Tank car	Tank car	Drums
Atlanta	$82.00	$41.00	$2.25	$26.00	$33.25	$0.215	$0.455	$0.095w	$0.185w	$0.105	$0.115	$0.225
Baltimore	150.00‡	75.00‡	....	22.00i	.....	.0809i	0.15i	.09iw	.17iw	.09i	.09i	0.12i
Birmingham	......	45.50i	.....	......	.....	.....	.....	......	......	......	......	......
Boston	......	......	.....	24.50a	35.50a	22.00av	35.50av	......	......	.09a	.105a	.22a
Chicago	155.00‡	90.00‡b	3.60/3.65‡j	21.05b	31.05b	20.05bv	30.05bv	.0925bw	.1825bw	.0775b	......	.....
Cincinnati	.....	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....
Cleveland	200.00	65.00d	5.03g	23.00A	.....	23.00A	....	.1025Aw	.....	....	.11A	.18A
Dallas	e	40.00	e	24.05	43.09	.1016	.2103	27.09	47.87	.0980	.1041	.2128
Denver	......	50.00	......	.....	....	.....	.....	.....	.....	.....	.....	.....
Detroit	.....	92.00	.....	27.21	....	27.21v	.....	.1202w	.....	.0925	.....	.2811v
Kansas City	e	e	e	16.20cl	...	.06	.....	.07cw	.....	.06c	0.10	.....
Los Angeles	e	......	e	16.00dmx	...	16.00dvx	...	18.00dx	.....	17.00dv	.0825j	.1725j
Minneapolis	......	......	2.97h	22.00	....	24.07	....	.0744w	.....	.08	.10	.....
Montreal	.....	e	e	27.10n	36.65n	.135n	.193n	16.30nu	18.80nu	.132n	.184ns	.225ns
New Orleans	.....	......	.....	17.50e	....o	17.50ev	.....o	.085ew	.....o	.0825B	.085	....
New York	.....	.....	3.12f	26.26q	47.59q	25.26vt	46.58vt	.1071w	.2021w	.1071	.1072	.1993
Philadelphia	175.00	110.00	4.06	22.00	.....	.....	.....	.095u	.....	.....	...	.....
Pittsburgh	165.00	48.00	4.60	27.00	37.00	10	21	27.00	40.00	.095	.10	.22
St. Louis	.....	.....	.....	18.66f	....	.1758	....	.084 / 0865•	.....	0.155	.10	.....
San Francisco	.....	55.00•	.....	17.50g	33.00gp	17.50gkv	23.00gkv	20.00g	37.50g	18.75v	.085y	....
Seattle	.....	.....	.....	17.50h	38.00h	17.25hv	.....	20.00h	..	19.75hv	.085h	.095hv

‡ Delivered.
PAVING BRICK & BLOCK: a CL. b 3½ x 4 x 8½. c 2½ x 8½ x 4. d LCL truck deliveries. e Not used. f 2" interior 6# treat. g 3". h 8# treat. i 3 x 3⅝ x 8½. j 2½", 6 tr.
ASPHALTS: a Price at plant, Everett, Mass. b F.o.b. refinery, Lockport, Ill. c F.o.b. Sugar Creek, Mo. d F.o.b. refinery, El Segunda. e F.o.b. Baton Rouge. f F.o.b. Wood River or Roxana, Ill. g F.o.b. Richmond, Calif. h F.o.b. Martinez. i F.o.b. refinery, Baltimore. j F.o.b. refinery, Inglewood, Calif. k 50–110 penetr. l Less than 100 penetr. m 40–80 penetr. n Tax incl. o Drums not avail. p Shipped in steel bbl. q 40–85 penetr. r In customer's drums. s Shipped in drums, per drum. t 85–300 penetr. u Per 100 gal. v Per ton. w Per gal. x Also tank trucks. y F.o.b. Oakland. A F.o.b. refinery, Cleveland. B F.o.b. Norco, La.

IRON AND STEEL PRODUCTS—PER 100 LBS. BASE MILL PRICES

	STRUCT SHAPES—	PLATE CARBON STEEL	REINF BARS billet	RIVETS ¾-in. structural	SHEET PILING Base	STEEL RAILS Per Net Ton Standard	Light	Re-rolled	TRACK SUPPLIES Angle Bars	Std Spikes	Tie Plates	Track Bolts
Birmingham Area	$4.10	$4.10	$4.15	$8.90	....	$86.50	$104.00	Not available	$5.275	$7.05	$5.125	....
Chicago Area	4.10	4.10	4.15	8.90	$4.925	86.50	104.00		5.275	7.05	5.125	....
Pittsburgh Area	4.10	4.10	4.15	8.90	4.925	86.50	104.00		5.275	7.05	5.125	$11.00
Buffalo Area	4.10	4.10	4.15	8.90	4.925	86.50	104.00	....	5.275	7.05	5.125	11.00
Cleveland	....	....	4.15	8.90	4.925	......	......	....	....	....	....	11.00
Youngstown Area	....	....	4.15	....	....	......	......	....	....	7.05	....	....
Geneva	4.10	4.10	....	....	....	......	......	....	....	....	....	....
Los Angeles	....	....	....	....	4.925	......	......	....	....	7.05	....	
Pueblo	4.30	4.70	4.75	....	....	......	95.00	....	5.275	7.05	5.125	11.00

IRON AND STEEL PRODUCTS—F. O. B. WAREHOUSE, PER 100 LBS., BASE PRICE

	STRUCTURAL SHAPES Per 100 lb. base price	REINFORCING BARS Per 100 lb., base price u 5 tons to carload lot b New billet	Rail steel	Add switch	$/cwt for Del.	EXPANDED METAL LATHk Per 100 sq. yd., carload lots Std. diamond mesh. 3.4 lb.	Std. ribbed 3.4 lb.	WELDED FABRIC REINFORCINGd Per 100 sq. ft., carload lots 4x16 in., No. 5 & 10 wires	4x12 in., No. 8 & 12 wires	6x6 in., No. 6 & 6 wires
Atlanta	$7.31	$7.11	$7.11	$.025	$...	$38.00‡	$42.00‡	A.P.M.* Joliet, Illinois, Donora, Penn., $3.08 F.o.b. Mill: Monessen, Penn., $3.08	A.P.M.* Joliet, Illinois, Donora, Penn. $2.02 F.o.b. Mill: Monessen, Penn., $2.02	A.P.M.* Joliet, Illinois, Donora, Penn., $3.23 F.o.b. Mill: Monessen, Penn., $3.23
Baltimore	6.98	6.91l		....	....	42.00	45.00			
Birmingham	6.35	6.15	6.15	.05	.15	47.00p	52.00p			
Boston	7.06a	7.22	7.22	....	....	40.50	44.50			
Chicago	6.46	5.75ff	5.75ff	.0625	....	46.00C	51.00C			
Cincinnati	6.93ak	6.71r	....	....	.15	38.00szee	42.00szee			
Cleveland	6.79	5.61v	....	....	....	39.00‡	43.00‡			
Dallas	9.05	7.25	7.25	....	....	49.00	52.00			
Denver	7.95	7.30c	....	....	....	52.50s	64.50qs			
Detroit	6.93	7.04n	....	....	.20	53.00	58.00			
Kansas City	7.05nn	7.27	....	....	....	43.50	45.00			
Los Angeles	7.35fhh	6.85g	....	....	....	51.00	57.00			
Minneapolis	6.92hh	7.53ll	7.53ll	....	....	37.00	41.00			
Montreal	8.20iB/9.20A	6.05i	6.05g	....	....	53.50h	58.50h			
New Orleans	....	5.98oh	....	.05	....	66.00	60.00			
New York	7.20	7.01	7.01	....	.30	38.50st	44.00st			
Philadelphia	6.42	6.67	....	....	....	38.00‡	42.00‡			
Pittsburgh	6.40	6.40	....	....	.10	37.60	39.60			
St. Louis	6.86a	6.30c	6.30c	....	....	50.00aa	55.00aa			
San Francisco	7.25	6.85l	....	....	....	40.50	43.50			
Seattle	4.85e	6.20el	....	....	....	57.00smm	47.00smmz			

* At Producing Mill.

‡ Delivered. *b* Less than 700# add 50¢; 700–1499# add 65¢; 1500 to 7999# add 50¢. *c* 20 tons or over base. *d* Mill price plus freight. *e* F.o.b. plant. *f* Includes delivered in free delivery zone. *g* 10,000 to 39,999 lbs. *h* List price. Dominion tax exempt. Provincial and Municipal tax extra. *i* Plus Dominion, Provincial and Municipal sales tax. *j* Price per ton. *k* F.o.b. city. *l* Intermediate and hard grade, new billet. *m* Per sq. yd. *n* 5–10 tons. *o* 5 to 20 tons base. *p* Del. of 500 sq. yd. or more. *q* Std. ribbed. 4 lb. per sq. yd. *r* 5 tons or over. *s* LCL. *t* Asphalt coated. *u* Note: Revised size extra — 1 in., 1¼ in., 1½ in., 30¢, ⅞ in., ¾ in., 45¢, ⅝ in., 55¢, ½ in., 80¢, ⅜ in., $1.10, ¼ in., $2.20. *v* 20 tons. Straight. *w* Copper bearing. *x* 2.5 lb. per sq. yd. *y* $0.0093 transportation tax included. *z* Copper alloy. *aa* Delivered truck to job. Contractor to do unloading. *dd* F.o.b. dock. *ee* F.o.b. cars. *ff* Carload lots. *gg* Including sales. *hh* 10,000–19,999 lbs. *ll* 5 to 8 tons, f.o.b. city. *mm* 2% off for cash. *nn* 1–5 tons. *#* 10 tons to CL. *a* 2000–9999 lbs. *A*. Amer. struct'l shapes. *B*. Canadian shapes. *C*. Deliv to contractor.

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE Per net ton f.o.b. 6 in. to 24 in.a	ASBESTOS CEMENT PIPE per lin. ft., f.o.b. city 6" Pr Cl. 150	12" Sew Cl. I	VITRIFIED SEWER PIPE Per foot, Delivered ASTM C13-44T std. 8 in. s.s.	std. 12 in. s.s.	24 in. ds.	36 in. ds.	CLAY DRAIN TILE ASTM C4-24 Per 1,000 ft., carload lots, f.o.b. 6 in.	8 in.	CONCRETE SEWER PIPE Per ft., delivered: ASTMC 14-41 12 in.	24 in.
Atlanta	$101.00	$1.45	$2.42	$ .545	$1.27	$4.82	$12.925	$248.00	$356.00	$1.23	$2.62
Baltimore	121.50	1.45	2.42	.518	.999	4.095A	11.1725A	178.20	274.80	.95	2.60
Birmingham	103.00	1.45	2.42	.42	.75	2.99	....	250.00‡	375.00‡	1.25m	2.75m
Boston	113.00	1.47	2.20	.553uvx	1.0665uvy	4.41uvy	11.90uvy	187.80v	289.20v	1.62mg	3.95mg
Chicago	107.00	1.45	2.20	.70m	1.35m	5.62m	13.50m	150.00‡	270.00‡	.80	2.80
Cincinnati	106.00	1.47	2.29	.581y	1.120y	4.41y	11.375v	164.40	254.10	.80m	2.95m
Cleveland	108.00	1.47	2.29	.462x	.945x	3.69x	10.04x	158.00m	245.65m	.82m	3.10m
Dallas	112.00	1.47	2.54	.436	.822	3.234b	9.17b	......	......	.49	1.60
Denver	115.00	1.53	2.54	.45dd	.78dd	3.48dd	....	......	......	.74m	2.50m
Detroit	108.00	1.47	2.29	.75	1.45	5.75	15.50	240.00m	360.00m	.80	3.20
Kansas City	113.00	1.47	2.29	.53	.945	3.87	10.60	250.00	480.00	.80g	3.25g
Los Angeles	126.35	1.53	2.29	.62f	1.26f	5.21f	14.89f	228.20f	348.90f	.95	2.75ff
Minneapolis*	112.00	1.49	2.42	.72mo	1.32mo	5.32mo	..	......	......	1.38h	3.93h
Montreal	110.00	....	....	.85z	1.50z	5.25	8.50•	......	......	1.17j	3.11j
New Orleans	101.50	1.45	2.42	.53	.965	5.13	...	300.00bb	500.00bb	.65	2.29
New York	111.35	1.47	2.20	.63	1.22	4.82	12.81		......	1.15	3.00
Philadelphia	110.00	1.45	2.20	.65	1.25	4.95A	12.65A	300.00‡	350.00‡	1.55h	3.75h
Pittsburgh	110.00	1.47	2.20	.428m	.794m	2.97m	7.92m	152.00	244.00	1.05h	2.50h
St. Louis	112.00	1.45	2.29	.56	1.03	4.22	9.80	180.00l	380.00l	1.20il	2.85hl
San Francisco	127.00	1.53	2.29	.61d	1.20d	5.03d	12.57d	240.00l	400.00l	.73	3.02
Seattle	122.00	1.54	2.42	.51b	.91b	....	..	150.00c	......	.77ee	2.30ee

*WROUGHT STEEL PIPE

(Full standard weight)

Discount from list; see footnote

Mill	2½ & 3 in., Butt Weld† Black %	Galv. %	3½ to 6 in., Lap Weld† Black %	Galv. %
Lorain, Ohio	36.75	20.50	....	....
Aliquippa, Pa.	36.75	20.50	27.75d	11.00d
Sparrows Pt., Md.	34.75	18.50	22.75d	6.00
Benwood, W. Va.	36.75	20.50	26.50d	9.75d
Youngstown, O.	36.75	20.50		
Indiana Harbor, Ind.	35.75	19.50	26.75ab	10.00a
Sharon, Pa.	36.75	20.50	....	
Wheatland, Pa.	36.75	20.50	27.75d	11.00d
Etna, Pa.	36.75	18.50b	26.50d	7.75d
Fontana, Calif.	23.75b	10.00b	14.75ab	0.50ab

† Threaded and coupled. *a* 3½ to 4 in. *b* Continuous weld. *c* 5 and 6 in. *d* 6 in.

‡ Delivered. *a* Class B & heavier. Based on existing freight rates; subject to rate change. Gas pipe and class A, $5 per ton additional. 4 in., $7 per ton additional. 30 in. and larger, usually, $1 per ton less. *b* Extra strength ASTM C 200–44T. *c* 4-in., $90. *d* SS361-A. *e* 30-in. *f* F.o.b. factory. *g* Culvert pipe. Reinforced, ASTM C76–41. *h* Reinforced, ASTM C75–41. *i* Reinforced, ASTM C76–37. *j* Centrispun. No standard specifications in Can. *l* F.o.b. plant. *m* Truck delivery. *o* Listed price is based on LCL (no minimum). *p* Less than 5 tons, per price per ft. *t* Within switching limits. *u* ASTM C13–40. *v* C.L.f.o.b. origin, freight allowed. *x* 2 ft. lengths. *y* 3 ft. lengths. *z* CESA A 60–1941 specifications used. *aa Extra strength ASTM C-200-50.* A standard strength. • 6", $1.67 per ft.; carlots, F.o.b. track Class 150. *bb* Freight allowed to destination in city. *cc* Truck loads; f.o.b. plant, Newton. *dd* LCL delivered, f.o.b. truck. *ee* 1% off for cash. *ff* 21.

*WROUGHT STEEL PIPE: Deduct discounts shown above from the following standard list consumers carload prices to get mill price. List prices per ft. (based on approx. $200 per net ton): *Butt Weld* ⅛ in., 5½¢; ¼ in., 6¢; ⅜ in., 6¢; ½ in., 8½¢; ¾ in., 11½¢; 1 in., 17¢; 1¼ in., 23¢; 1½ in., 27½¢; 2 in., 37¢; 2½ in., 58½¢; 3 in., 76½¢. *Lap Weld* 3½ in., 92¢; 4 in., $1.09; 5 in., $1.48; 6 in., $1.92. Add freight rates plus 3% transportation tax to get destination price.

WROUGHT IRON PIPE: List prices per ft. same as for wrought steelpipe, but add following "discounts" to get Pittsburgh mill price: *Butt Weld* — 1 in. black, + 32.75, galv. + 57.0; 1¼ in. black, + 32.75, galv. + 56.5, 1½ in. black, + 29.25 galv. + 52.75; *Lap Weld* — 2½ in. to 3 in. black + 33.50 galv. + 55.5; 4½ in. to 6 in. black + 30.50 galv. + 50.75. Add freight rates plus 3% transportation tax to get destination price.

(Cont. on p 309)

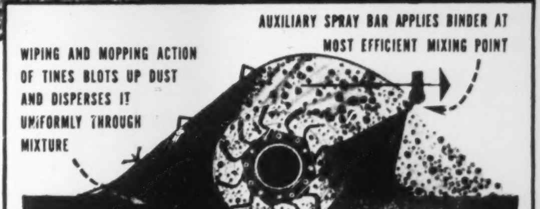
W. G. "Barney" BELL

Project Superintendent, Piombo Construction Co.

SAYS:

" The SEAMAN mixes 50 feet per minute. It is faster and more economical, saves 50% in cost..."

SEAMAN Trav-L-Plant pumps water from truck, applies thru the spray bar directly into the mix.


AUXILIARY SPRAY BAR APPLIES BINDER AT MOST EFFICIENT MIXING POINT
WIPING AND MOPPING ACTION OF TINES BLOTS UP DUST AND DISPERSES IT UNIFORMLY THROUGH MIXTURE
DUST FILM ON BASE

Spray bar applies any fluid binder instantly and accurately into the mixing chamber, provides complete control of uniformity and avoids loss of bitumen by migration or water by evaporation.

They're using a SEAMAN Self-Propelled Trav-L-Plant on the big Bayshore Freeway widening project in Mateo County, Cal. — and as Mr. Bell, the project superintendent for Piombo Construction Co. attests — "The SEAMAN saves 50% in cost."

That's a lot of money when you consider that the total construction will run $1,700,000!

In constructing the cement-treated base, the SEAMAN is pulverizing, mixing and placing the materials for maximum density — partially pre-compacted for finished rolling. The SEAMAN maintains accurate depth control and by proper blending and placement corrects segregated material.

The SEAMAN Trav-L-Plant applies the water in processing. This is pumped from a tank truck operating just ahead and applied with a spray bar directly into the mixing chamber. In consequence the water is under complete control and is mixed instantly and thoroughly with virtually no evaporation loss.

That's the facility a SEAMAN Trav-L-Plant provides you — any fluid binder, water, asphalts, tars or emulsions are applied at the point where they are mixed most efficiently and quickly — with no run-off or migration.

In every in-place mixing job, large or small, the SEAMAN quickly repays its investment in lower cost, faster production schedules and far greater versatility in the types of work it does.

The SEAMAN SELF-PROPELLED TRAV-L-PLANT
SEAMAN PULVI-MIXER
SEAMAN MOTORS

Send for the new Bulletin completely describing the SEAMAN Self-Propelled Trav-L-Plant and the SEAMAN Self-Propelled Pulvi-Mixer. Shows many job scenes; fully describes mixing method. Write for Bulletin TSP.

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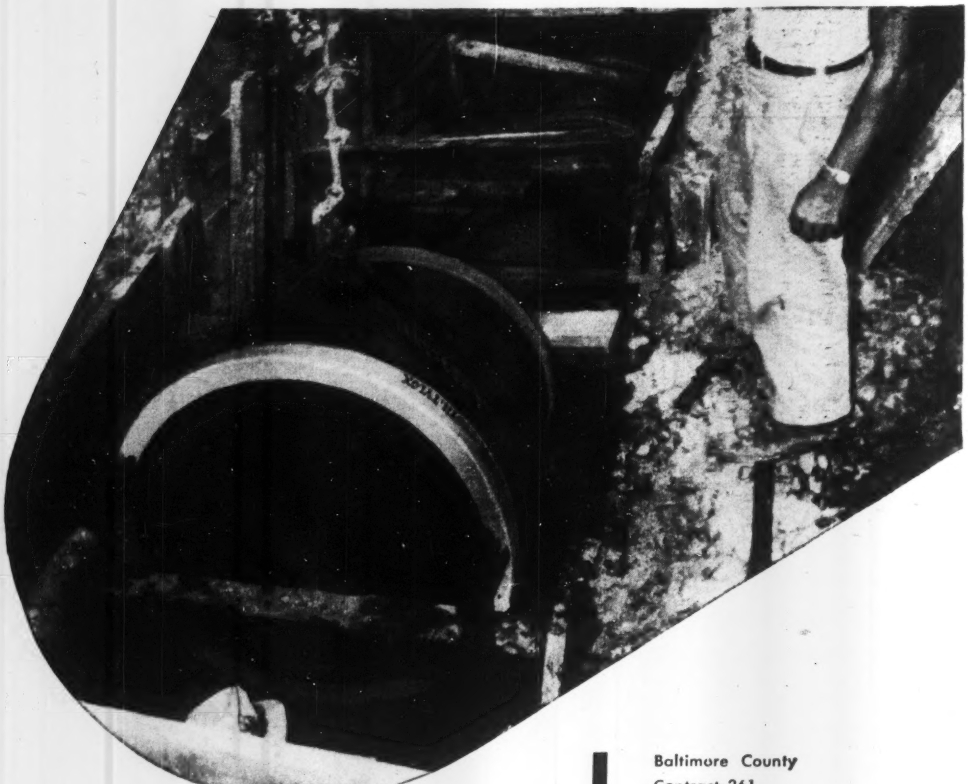

Baltimore County
Contract 261
Wise Avenue at
Bear Creek Bridge
30″ Extra Strength
Vitrified Sewer Pipe
with Tylox Flexible
Rubber Coupling

ENGINEERS

Whitman Requardt and Associates
Baltimore, Maryland

CONTRACTOR

Leo Butler Company
College Park, Maryland

Your Professional Reputation is SAFE . . .
When You Specify . . .

UNIVERSAL VITRIFIED or UNITED STATES CONCRETE SEWER PIPE

With these products you get long term, over-the-years dependability assured by highest quality materials, modern production machinery and methods — and long experienced "know-how".

Prompt delivery is achieved by eight large plants strategically located.

Fair and equitable pricing is the result of these factors.

PRODUCTS

- Sewer Pipe (Vitrified)
- Sewer Pipe (Concrete)
- Vitrified Liner Plates
- Tylox Flexible Rubber Coupled Vitrified Pipe
- Aerodrane Filter Block
- Slipseal Sewer Joint
- Segment Sewer Block
- Meter Boxes
- Ship Lap Wall Coping
- Septic Tanks
- Drain Tile
- Flue Lining
- Stove Pipe
- Chimney Tops
- Chimney Pots
- Fire Brick
- Fire Clay
- Vitrified Clay Plate Lined Concrete Pipe

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UNIVERSAL SEWER PIPE CORPORATION
UNITED STATES CONCRETE PIPE CO.

• *GENERAL OFFICES* • 1500 Union Commerce Building • CLEVELAND 14, OHIO

LUMBER, TIMBER, PLYWOOD—PER M FT., B.M., CARLOAD LOTS F.O.B.

SHORT LEAF YELLOW PINE AND DOUGLAS FIR

All S. L. Y. P. is No. 2 common or better and for No. 1 N. C. Box. (Prices in Bold Face)
All Fir boards, dimensions, planks No. 2, Fir small timbers and timbers are No. 1 Lengths up to 20 ft.
(*Prices in italics*)

LONG LEAF Y. P. Merchantable grade up to 20 ft.

PLYWOOD Rail freight increment (See note for base price)

	1x6 s4s	1x8 s4s	2x4 s4s	2x6 s4s	2x8 s4s	2x10 s4s	3x12 Rgh	6x12 Rgh	12x12 Rgh	L. L. 2x12 Rgh	L. L. 12x12 Rgh	Plywood ⅝"	Plywood ¾"
Atlanta †	**$79.00**	**$82.50**	**$73.50**	**$76.00**	**$79.50**	**$83.00**	**$81.00**	......	......	......	......	$22.32	$27.24
Baltimore *	**90.00**	**94.00**	**77.50**	**77.50**	**78.00**	**84.50**	**111.50**	......	......	**$155.00**	**$155.00**	25.92*	31.60*
	103.00g	*103.00g*	*94.50g*	*94.50g*	*94.50g*	*94.50g*	*96.00*	*$105.00*	*$105.00*	......	......		
Birmingham †	**80.50**	**82.50**	**70.50**	**80.50**	**83.50**	**85.50**	**95.50**	......	......	**115.50**	**155.50**	21.78	26.58
	83.50	*83.50*	*77.50*	*79.50*	*78.50*	*78.50*	*83.50*	*85.50*	*85.50*	......	......		
Boston	**94/99a**	**94/102a**	**90/98***	**92/100***	**95/102a**	**98/110a**	......	......	......	......	......	**25.92***	**31.60***
¹	*90.00**	*90.00*	*94.00*	*96.00*	*96.00*	*96.00*	*100.00*	*108.00*	*119.00*			.....	.....
Chicago **	**94.00**	**97.00**	**85/86**	**94.00**	**96.00**	**99/100**	**103.00**			**132.00**	**132.00**	22.45*	27.37*
	94.00	*94.00*	*98.00*	*98.00*	*99/100*	*101/102*	*107.00*	*107.00*	*107.00*				
Cincinnati *	**96.00**	**102.00**	**85.50**	**95.00**	**102.00**	**104.50**	**118.75**	......	......	**140.50**	**140.50**	**25.00***	**30.48***
	106.25	*106.25*	*108.00*	*106.50*	*108.00*	*106.25*	*133.00*	*133.00*	*133.00*	......	......		
Cleveland **	**92.00**	**94.00**	**87.00**	**93.00**	**95.00**	**98.00**	......			......	......	**25.37***	**30.93***
	......	......	*94.00*	*95.00*	*95.00*	*95.00*	*108.00*	*108.00*	*108.00*	......	......	.....	.....
Dallas k†	**78.00**	**80.00**	**69.00**	**58.00**	**59.00**	**59.00**	**98.00**			**97.00**	**98.00**	18.72	22.80
Denver *	*Not in stock*		*106.00*	*106.00*	*106.00*	*106.00*	*122.00*	*135.00*	*140.00*	......	......	13.92	16.98
Detroit ‡	**110.00**	**115.00**	**101.00**	**110.00**	**114.00**	**116.00**	......	......	......	......	......	**25.00***	**30.48***
	93.50	*95.50*	*93.50*	*94.25*	*92.25*	*90.00*	*108.50*	*115.00*	*115.00*	......	......	.....	.....
Kansas City *	**107.50**	**107.50**	**102.50**	**105.00**	**108.00**	......	......	......	......	......	......	**16.56**	**20.16**
	105.00	*105.00*	*105.00*	*105.00*	*105.00*	*107.50*	*130.00*	*132.50*	*132.50*	......	......	.....	.....
Los Angeles ¹	*82.00*	*82.00*	*82.00*	*82.00*	*82.00*	*82.00*	*110.00*	*115.00*	*110.00*	......	......	**16.61*ab**	**20.25*ab**
Minneapolis #	*135.00*	*135.00*	*135.00*	*135.00*	*135.00*	*135.00*	*155.00*	*155.00*	*155.00*	......	......	**19.89***	**24.25***
Montreal	**ab90.00**	**92.00**	**92.00**	**92.00**	**102.00**	**102.00**	......	......	......	......	......	.....	.....
	165.00	*165.00*	*165.00*	*165.00*	*165.00*	*165.00*	*165.00*	*165.00*	*165.00*	......	......	.....	.....
New Orleans †	**100.00**	**100.00**	**92.50**	**85.00**	**90.00**	**94.00**	**118.00**	......	......	**150.00**	**148.00**	18.72	22.80
†	*97.00*	*101.00*	*109.50*	*109.50*	*107.50*	*107.25*	*107.50*	*117.50*	*107.50*	......	......	.....	.....
New York ³	**107.50**	**110.00**	**115/120**	**120/125**	**120/125**	**125/130**	**155/165**			**220/240**	**220/240**	25.92*	31.60*
	......	......	*Range from $120.00 to $125.00*				*135/150*	*149/159*	*149/159*	......	......	.....	.....
New York **	**88.00**	**90.00**	**80.00**	**88.00**	**90.00**	**92.00**	**130.00**			**190.00**	**190.00**	.....	.....
	89.00	*89.00*	*91.00*	*92.00*	*91.00*	*91.00*	*105.00*	*110.00*	*110.00*				
Philadelphia ‡			**Range from $110.00 to $127.00**				**110/127**	......		**210/220**	**210/220**	25.92*	31.60*
			Range from $120.00 to $150.00				*130/140*	*150.00*	*150.00*	......	......	.....	.....
Pittsburgh †			**Range from $90.00 to $95.00**			......	**110/120**	.....	......	**110/120**	**115/125**	25.92*	31.60*
			Range from $110.00 to $120.00			......	*130/140*	*140/155*	*140/155*	......	......	.....	.....
St. Louis #c	**110.00e**	**112.00e**	**98.00d**	**105.00d**	**113.00e**	**115.00e**	......	......	......	......	......	**18.72**	**22.80**
	......	......	*108.00d*	*114.00e*	*114.00e*	*115.00e*	*162.50e*	*167.50*	*177.50*	......	......	.....	.....
San Francisco A†	*58.00*	*58.00*	*59.00*	*59.00*	*59.00*	*57.00*	*57.00*	*57.00*	*57.00*	......	......	**12.22*a**	**14.91*a**
Seattle †	*75.00g*	*75.00g*	*75.00g*	*75.00g*	*75.00g*	*75.00g*	*85.00g*	*85.00g*	*85.00g*	......	......	.....	.....

† F.o.b. mill. * F.o.b. city, CL, out of yard. ** F.o.b. city, CL, direct mill shipment. ‡ Deliv. to contr. CL. 1. Retail, LCL, at yard. # Retail, LCL, deliv. 2. Deliv. truck lots. 3. asd.

LUMBER: **Bold Face type, Southern Pine.** *Italics, Douglas Fir.* *a* Spruce *b* Tax exempt. *c* 5M lots. *d* 8–12 ft. lengths. *e* 8–16 ft. lengths. *f* 18 ft. or under. *g* No. 1 common. *i* 8 ft. lengths. *k* No. 3 common: *l* 8–10 ft. lengths. *n* ⅓ #1, ⅓ #2 & ⅓ #3.

A Rail freight rate from Northwest mills to San Francisco are $11.50 to $15.00 per M ft bm. From Northern Calif. mills $9.00 by rail, $9.50 by truck. All rates for surfaced stock. For rough, add $3.00 to above figures.

PLYWOOD: Plyform grade Fir Plywood, 4′ by 8′ panels, 5-ply, sanded 2 sides, water resistant glue, carload lots, delivered per 1,000 sq. ft. surface. Seattle base price on ⅝", $159.00; on ¾", $181.00. Exterior plyform ⅝" $179.00, ¾" $203.00. For other centers add rail freight increment from table on proper size Oiling and edge sealing charges included. *a* Lower rate by water shipment *b* 50,000 lb. minimum.

* Incl. new freight rates. Rates for other cities not avail. as we go to press:

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS Discounts from jobbers list, Feb. 1, 1950a Single or Double Thickness		EXPLOSIVES Per lb. 40% Ammonia Gelatin in 50 lb. cases delivered in 200 lb. lots*
	A quality	B quality	
Atlanta	79%	80%	$0.2365
Baltimore	76%d	78%d	.2365
Birmingham	83%	83%	1840
Boston	77–10%	77–10%	.2365
Chicago	76%	76%	.2365
Cincinnati	78%	78%	.2365
Cleveland	76–10–10%	76–10–10%	.2765
Dallas	75%	75%	.2440
Denver	80%	80%	.2415
Detroit	78–10–10%	78–10–10%	.2365
Kansas City	80–10%	80–10%	.2415
Los Angeles	73%	78%	.2390
Minneapolis	75–10%	75–10%	.2415
Montreal	40–5%bc	40–10–5%b	21.60hi
New Orleans	78%	77%	.2415
New York	80–10–5%	80–10–5%	.3975g
Philadelphia	78%	80%	.2365
Pittsburgh	82%	82%	.2090
St. Louis	80–10%	80–10%	.2415
San Francisco	70%	70%	2365
Seattle	73%	76%	2390

Price of 60% Ammonia Gelatin is $0.15 per lb. higher than 40%

Glass; a Jobbers' list price per box, 14 x 20, ss, $42.75 for A quality, $37.50 for B quality; 14 x 20, ds, $60.00 for A quality, $52.75 for B quality. *b* Discount from list, Apr. 1951; sales tax included, but 6% tax exemption not allowable for. *c* Single thickness. *d* Discount 6/15/52.

Explosives; * Urban prices influenced by service charges or local storage and delivery regulations do not consistently reflect quantity prices in less congested areas. *g* In borough of Kings, Queens, and Richmond and in Manhattan south of Canal St., add delivery charge of $20.00 per trip. *h* F.o.b. city per 100 lb. forcite, 40% Forcite 60%, $23.35. *i* F.o.b. Beloeil (near Montreal).

40% Ammonia Gelatin price ranges in other than urban areas, per lb.
(except Seismograph Grades)

	C/L 20,000 lb. net	Tons	200 lb. lots
E. of the Miss., except Fla. and Me.	$0.184	$0.2165	$0.2365
W. of Miss. to Rocky Mtn. States, Fla. and Maine	.189 – .1965	.2215– .229	2415– .249
Rocky Mtn. States	.189 – .2015	.2215– .229	.2415– .254
Pacific N. W. States	.1865– .199	.219 – .2315	.239 – .2515
Pacific S. W. States	.184 – .1915	.2165– .219	.2365– .2415

PILES, TIES F. O. B.

PILES

Prices per linear foot, fir and pine, bark off, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine based on freight from Norfolk.

Dimensions	Points	Length	By Rail Pine*	By Rail Fir
12-in. at butt	6-in.	30 to 50-ft.	$0.51	....
12-in.— 2-ft. from butt	6-in.	50 to 59-ft.	.54	....
12-in.— 2-ft. from butt	6-in.	60 to 69-ft.	.58	....
12-in.— 2-ft. from butt	6-in.	90 to 100-ft.	....	....
13-in.— 3-ft. from butt	5-in.	91 to 100-ft.	....	....
14-in.— 2-ft. from butt	6-in.	50 to 69-ft.	.50/.68	....
14-in.— 2-ft. from butt	6-in.	70 to 79-ft.	.78/.83	.93
14-in.— 2-ft. from butt	5-in.	80 to 85-ft.	.83/.93	.94
14-in.— 2-ft. from butt	5-in.	85 to 89-ft.	....	1.00
14-in.— 2-ft. from butt	5-in.	90 to 100-ft.	....	1.02

* Pine piling over 80-ft available only in limited quantities.

RAILWAY TIES

Prices f.o.b. per tie for carload lots:		6"x8"x8' Untr.	6"x8"x8' Tr.	7"x9"x8'6" Untr.	7"x9"x8'6" Tr.
Boston	Oak†† i	....	....	....	....
	Pine i	....	....	....	....
New York	S. L. Sap Pine	$2.55	$4.35	$3.45	$5.45
	Mixed Oak	3.10	4.65	3.70	5.95
Birmingham	Hardwood	2.40	3.88a	2.85	4.58a
Chicago	Red Oak	....	3.40a	....	4.30/4.40a
Los Angeles	Douglas Fir	....	....	....	....
	Redwood	....	....	....	....
Philadelphia	Red Oak	2.55	3.90	3.45	5.10
St. Louis	White Oak	3.10	....	3.90	....
	Red Oak	3.00	3.75a	3.70	4.60a
	Sap Pine or Cypress	....	3.55a	....	4.50a
San Francisco	Douglas Fir	2.20e	3.25ef	2.92bf	4.30eaf
Montreal	Birch or Maple	....h	....h	....h	....h

Tr.— Treated; Untr.— Untreated. *a* Creosoted. *b* 7" x 9" x 8′. *c* Empty cell. *e* Green. *f* F.o.b. cars. *h* No constant price available. *i* Not available.

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder in drums f.o.b. works, per 100 lb.	$5.02
Chlorine cylinders, liquid, per lb. f.o.b. works	.0825
Calcium chloride, 77–80%, flaked, 100-lb. paper bag, f.o.b. works, ton	27.00
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb	2.30
Soda ash, 58%, in paper bags, per 100 lb. dense	1.75
Sulphate of aluminum, commercial, in 100-lb. bags f.o.b. works	1.85
Sulphate of copper, in bags, 99% per 100 lb. f.o.b. works	10.35

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE PARTITION — SCORED Per M. lots of 2,000 pieces or over, 3x12x12 in.	4x12x12 in.	8x12x12 in.	STRUCTURAL CLAY TILE — LOAD BEARING — SCORED Per M. lots of 2,000 pieces or over, 8x12x12 in.	10x12x12 in.	12x12x12 in.	BRICK Per M. in quantity Common backing	Straight hard	LIME Per ton, In paper, Carload lot, Hydrated finishing	Common hydrated	Pulverized, or lump
Atlanta	$195.00	$207.00	$247.50	$327.00	$342.00	$381.50	$27.38	$27.38	$19.00	$17.50	$17.50
Baltimore	186.00	198.35	372.00	421.50	549.00	627.00	36.00k	41.00k	32.00	21.50	....
Birmingham	126.00p	136.00p	......	284.00p	.....	.....	23.50ff	28.00gg	29.25	17.30	....
Boston	196.00†	209.00†	392.00†	383.25†	......	.....	36.85p	39.85p	30.00†	28.00†	....
Chicago	135.00	145.00	280.00	.....	......	.....	26.00	28.00	30.80	26.00	....
Cincinnati	185.00j	195.00j	340.00jdd	......	......	......	40.00j	46.00j	26.00j	26.00j	.....
Cleveland	172.00**	183.00**	......	......	......	......	34.50	34.50	28.25	23.25	32.00ee
Dallas	......	118.00	.....	......	.....	.....	19.75	35.25	32.00	21.80	.....
Denver	......	......	......	......	......	......	34.00	41.00	34.80bb	28.00bb	34.00bb
Detroit	127.75	136.25	255.55	......	317.25	362.60	37.50cc	35.60cc	33.50	31.50	.....
Kansas City	127.50	147.50	270.00	270.00	340.00	400.00	28.50	.....	32.00	26.00	28.50
Los Angeles	r	r	r	r	r	r	27.50§	.....	34.00	34.00	35.00
Minneapolis	175.00p	196.00p	407.00p	196.00wp	......	......	35.00vp	45.00	39.00bbe	29.00bbe	41.00bbde
Montreal	165.00aq	181.00au	325.00au	230.00	248.00	......	38.50	48.00	34.80	32.50	26.00u
New Orleans	170.00	170.00	310.00	380.00	......	......	31.00	.....	.....	28.00	28.00
New York	140.95h	150.30h	206.70ch	225.50hn	......	......	35.00	.....	36.00	32.00	.....
Philadelphia	145.30	155.00	290.60	348.70	......	......	30/34	35/42	25.00	23.00	2.97
Pittsburgh	112.00	117.00	189.00	216.00	279.00	317.00	36.00	46.00y	25.00	23.00	2.97m
St. Louis	142.00cc	160.00cc	319.00cc	465.00cc	439.00	621.50	40.00sl	36.00s	.90saa	.70saa	1.10aaspee
San Francisco	156.85a*	177.10a*	235.30dda*	......	......	......	37.00	.....	26.60	26.60	2.65m
Seattle	223.00cc	230.00cc	......	240.00ccw	......	......	34.00s	49.00s	42.00shh	37.50#	3.90mhh

† F.o.b. yard Roxbury. *a* Smooth. *b* Per 50 lb. bags. *c* 6 x 12 x 12 in.-3 cell. *d* Pulverized hot. *e* 5%, 10th following month. *g* 5½ x 8 x 12. *h* F.o.b. trucks, job site N.Y.C. *j* Truck load or over. *k* $1.00 discount *l* Red face. *m* Per bbl., 180 lb. *n* 7½ x 7½ x 12. Speed title. *p* Truck lots. *q* Provincial and Municipal tax extra. *r* Not used because of earthquake danger. *s* 2% discount for cash. *t* 5½ x 8 x 11½. *u* Tax exempt. *v* Sand lime. *w* 5 x 8 x 12. *y* Stacked. *z* Pebble lime price per 80 lb. sack. *aa* Price per sack. Lime not sold per ton. *bb* LCL. *cc* Truck delivery. *dd* 6 x 12 x 12. *ee* Pebble lime. *ff* 80% common. *gg* Select. *hh* LCL. § F.o.b. yard. # Per ton price, no incr. ** Warehouse delivery. * F.o.b. Stockton.

PAINT, ROOFING—F.O.B. CARLOAD LOTS

	RED LEAD Per 100 lb. in 600-lb. (Approx.) bbl. Dry a	WHITE LEAD Per 100 lb. in 100 lb. cases in oil w	READY-MIXED PAINT Per gal., drums Graphite b	Aluminum c	Ferric Oxide d	ROOFING SUPPLIES Carload lots f.o.b. factory Rolls, slate surfaced, 85–90 lb. per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating per gal.	Tar pitch 360 lb. bbl per ton
Atlanta	$16.25	$28.275	$3.26	$3.51	$3.01	$2.74	$3.01	$2.98	$0.405	$39.75
Baltimore	16.00	27.90	2.65	4.10	3.22	2.66	4.43	4.43	.47	45.56
Birmingham	16.25	28.275	3.90	3.40	....	2.93	2.93	2.93	....	42.00ee
Boston	16.00	27.90	....	...	....	2.91qg	3.03og	3.03og	.42g	47.00g
Chicago	16.00	27.90	....	...	...	3.29‡u	3.29‡o	3.29‡o	38.00‡bbr	48.00‡
Cincinnati	16.00	27.90	..	....	....	2.735	2.735	2.735	.46y	47.86
Cleveland	16.00	27.90	2.41pgg	2.71gg	2.52gg	2.97q	2.91o	2.91o	.43y	40.70hh
Dallas	16.25	28.65	....	4.05	....	3.50q	3.75o	4.35o	.36	58.50hh
Denver	16.50	28.40	3.07	5.15	2.87	2.66o	2.61o	2.61o	.43ff	47.00
Detroit	16.00	27.90	2.35	3.25	2.50	2.83	2.66j	2.66	.51	44.00
Kansas City	16.00	28.65	....	2.71ys	2.65	3.40	3.20o	3.20o	.43s	53.00
Los Angeles	16.00	28.15	3.30s	4.50s	4.20s	2.48s	1.66es	l	.55s	l
Minneapolis	16.00	29.88/28.02	....	....	....	2.74idd	2.74hidd	2.74hidd	.44idd	42.00r
Montreal	.....	21.15	2.95Dff	4.05Eff	3.25Fff	4.85t	3.65tf	3.65tf	1.24kt	3.78hh
New York	16.00	27.90	....	....	....	2.79G	2.74Go	2.74Go	.44Gz	42.00*
Philadelphia	16.00	27.90	3.25	3.65	3.15	2.54	2.94	2.94	.37	26.00
Pittsburgh	16.00	27.90	2.65	2.85	3.15	2.95	3.10o	3.10o	.35	45.00
St. Louis	16.00	27.90	....	....	....	2.67	2.67h	2.67h	.39y	41.70
San Francisco	16.00	28.15	2.40	....	3.40	2.95	4.00aa	....	.49	.....
Seattle	16.00	28.40	3.07m	2.93m	....	3.58mgco	3.05hmcc	....	.59mcc	52.00jms

‡ Delivered. Note: Red lead in oil 50c higher than white lead in oil. *a* Red lead prices change frequently due to pig lead price changes. *b* U. S. War Dept. Spec. 3-49A. *c* ASTM Spec. D266-31. *d* 80% minimum ferric oxide. *e* 15 lb. *f* Per 432 sq. ft. *g* F.o.b. yard, Roxbury. *h* Per roll. 65 lb. *i* Net carload lot prices; Minneapolis and vicinity. *j* Asphalt pitch. *k* Per cwt. *l* Not used. *m* 1% discount for cash. *n* F.o.b. city. *o* Per 60-lb. *p* 6-drum, 50 gal. ea. *q* Per 90-lb. roll. *r* F.o.b. factory Chicago. *s* 466 Med. *t* Federal tax included. *u* Per 90 lb. square. *v* Per ton. *w* Price to large paint contractors is $1.25 less. *x* Mineral surfaced. *y* 55-gallon container. *z* Drums. *aa* Approximate cost per 100 lbs. *bb* Roofers coating and cement: Price per ton. *cc* LCL, truck delivery. *dd* 2% cash discount. *ee* Asphalt: in 100 lb. package. *ff* 5-gal. drums. *gg* F.o.b. factory. *hh* Incl. freight: *D*. Std Black. *E* Ready-mixed, *F*. Over 80% ferric oxide. * Aver. wt: approx. 500 lbs. *G* Freight allowed to destination not exceeding .50 cwt.

SKILLED AND COMMON WAGE RATES—PER HOUR

	Bricklayers	Carpenters	Struct. Iron Workers	Hoisting Engineers	Plasterers	Electrical Workers	Steamfitters	Common Labor Building	Common Labor Heavy Const.
Atlanta	$3.10	$2.50	$2.75	$2.50	$2.90	$2.75	$2.90	$1.28	$1.28
Baltimore	3.20d	2.75	3.275c	3.10/3.25	3.075c	2.875	2.975t	1.675c	1.675c
Birmingham	3.15	2.40	2.825h	2.245	2.62	2.875	2.875h	1.30	1.40
Boston	3.185e	2.75	3.15c	3.20	3.20f	3.13d	3.10d	1.99n	1.99n
Chicago	3.40k	3.15e	3.20m	3.00m	3.525v	3.37f	3.24e	2.35h	2.35h
Cincinnati	3.225	2.875	2.99h	2.75/3.00	3.05	3.03N	3.125h	2.02	2.02
Cleveland	3.25i	3.20#	3.20i	3.20	3.20	3.20	3.20e	2.45	2.45
Dallas	3.50	2.625	2.75	2.75	3.437	2.90	2.90	1.40	1.40
Denver	3.50	2.775	2.75	2.705	3.30	3.00	2.97	1.80	1.80
Detroit	3.33e	3.08e	3.23e	3.23x	3.32l	3.22H	3.15h	2.28z	2.28e
Kansas City	3.625	2.675	2.805	2.64/2.885	3.25	2.987o	3.075h	1.98	1.98
Los Angeles	3.285G	2.70	2.925h	2.57	3.437	3.10	3.125e	2.05	2.05
Minneapolis	3.125	2.70	2.82	2.65	2.90w	3.00n	2.875	1.95	1.95
New Orleans	3.05	2.42	2.80m	2.60	2.625	2.925h	2.75e	1.375	1.375
New York	3.874br	3.43bJ	3.759B	3.69J	4.00A	3.63asF	3.64bL	2.20	2.20
Philadelphia	3.61i	3.10	3.51iM	3.35/3.50e	3.475h	3.45u	3.515g	1.875	2.175
Pittsburgh	3.475h	3.20h	3.475h	3.325h	3.30h	3.35	3.00	2.025h	2.025h
St. Louis	3.62c	2.975h	3.025h	3.00	3.25h	3.28c	3.05B	2.075h	2.075h
San Francisco	3.475bk	2.905h	3.075h	2.66	3.45ek	3.225h	3.275K	2.075k	2.075h
Seattle	3.30	2.58	2.78	2.71	3.15	2.925	2.95	2.18	2.24d
Montreal*†	2.00	1.80	1.90	1.70	2.00	1.90	1.95	1.25	1.25

* Cost of living bonus now included in basic wage. # Includes 5¢/hr tool replacement. † Plus 2% vacation pay.

a 6 hr. day. b 7 hr. day. c Incl. 3% vac. stamp fund plus 7¢ WF for bricklayers; 4% VF for electricians plus 8¢ WF, 1% PF d Incl. 10¢ H&WF. e Incl. 6¢ H&WF. f Incl. 6% WF. g Incl. 11½¢ WF. h $2.625 homes & housing plus 7½¢ VF. i Incl. 3½% WF and 15¢ PF. j Incl. 10½¢/hr WF. k Incl. 7½¢/hr WF. l Incl. 4% VF. m Incl. 5¢/hr WF. n Incl. 20¢ H, W, Ins., Vac. & Retirement. o Incl. 10¢ PF, 8¢ WF. p Incl. 3% WF, 3% PF. q Incl. 3½% WF and 20¢ PF. r Incl. 5% W&PF, 4% VF, 1% NC, 6 PH. s Incl. 7½¢ H&WF. t Incl. 1½% WF. u Incl. 10¢ WF. v Negotiating. w Incl. 8¢ WF. x Incl. 22½¢ WF. y Incl. 7½¢ IF, 5¢ H&WF. A Incl. 10¢ WF, 10¢ PF & 20¢ B.F. B Incl. 3% WF, C Incl. 2½¢ H&WF. E Plus 5% WF, plus travel pay per day. F Plus $1 per day travel time. G Incl. 11¢ H & WF. H Incl. 7¢ WF. I Incl. 15¢ H&WF. J Incl. 4% WF, 6PH. K Incl. 10¢ H&WF 10¢ VF. 2½% PF. L Incl. 3% WF, 3% PF, 1% VF. M Incl. 7½¢ PF. N Incl 1% WF O Incl 2% WF, 1% PF.

MEXICO CITY PRICES

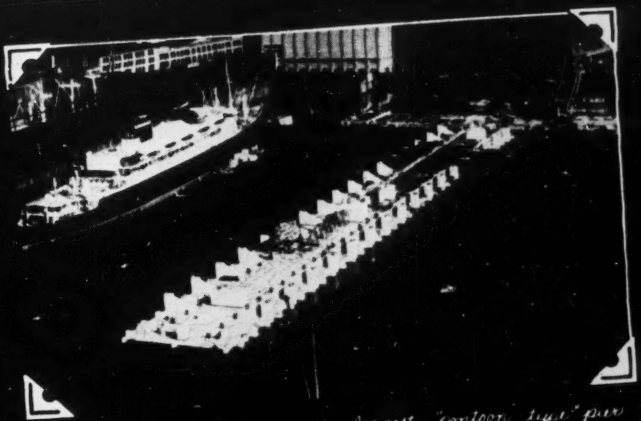
In Pesos, F.o.b. City		Aug.'53	Sept.'53
Common Wages—Building (8 hr. day) (Peons)	av. per hr.	.84	.84
Common Wages—Heavy Const. (8 hr. day) (Peons)	av. per hr.	.84	.84
Skilled Labor Wages			
Carpenters (8 hr. day) 1 cl.	av. per hr.	1.88	1.88
Bricklayers (8 hr. day) 1 cl.	av. per hr.	1.88	1.88
Struct. Iron Workers (8 hr. day) ....Remachadores.	av. per hr.	1.13	1.13
Struct. Steel Shapes			
3"-15" x 12 meters	per metric ton	1224.23	1224.23
Reinf. Steel, Corr. Rods			
⅜" x 11 meters	per ton	1386.77	1386.77
½" x 11 meters	per ton	1375.56	1375.56
⅝" x 11 meters	per ton	1364.35	1364.35
¾" x 11 meters	per ton	1353.14	1353.14
⅞" x 11 meters	per ton	1353.14	1353.14
1" x 11 meters	per ton	1353.14	1353.14
Gravel truck load of 3½ cu. meters			
Blue Gravel	per tr. load	60.00	60.00
Rose Gravel	per tr. load	55.00	55.00
Cement, Std. Port. (Tolteca)	per ton	160.00	160.00
Lumber			
Mex. Sacred Fir (OYAMEL)	per M ft.	750.00	750.00
1st Class Pine	per M ft.	1350.00	1350.00
2nd Class Pine	per M ft.	1100.00	1100.00

1st & 2nd fl. add 40% ea. addn'l floor over preceeding one

ENR Skilled Average: (Bricklayers, Carpenters, Iron workers): $3.085 **ENR Common Average:** $1.927

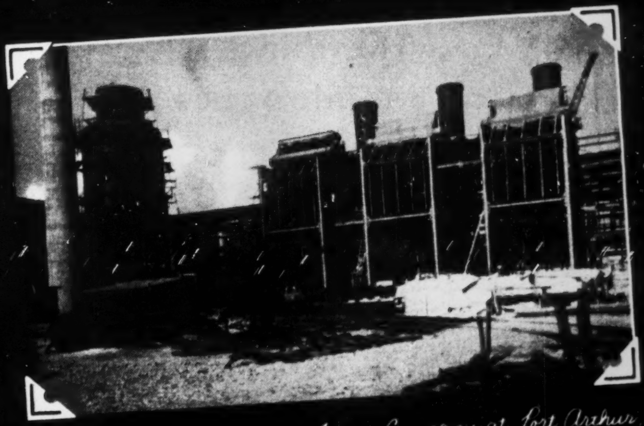
A Page from our Album of Construction "Firsts"

First Streptomycin plant in the world for Merck Chemical Co at Elkton, Va



Pier 57, New York City, world's largest "pontoon type" pier (a joint venture with another contractor)

Delaware Memorial Bridge river piers required record-size caisson; world's largest pour of tremie concrete



Outdoor boiler plant for Texas Company at Port Arthur, Texas, was largest in the U S when built

MERRITT-CHAPMAN & SCOTT
CORPORATION
FOUNDED IN 1860
GENERAL OFFICES:
260 MADISON AVENUE NEW YORK 16, N. Y.
CLEVELAND • WASHINGTON, D.C. • PASADENA, TEXAS • BIRMINGHAM

The KING of them all...

It's the NEW model 5-30

HOMELITE 5.5 Brake hp

One Man Chain Saw

HOMELITE
MODEL 5-30

- More Power
- Faster Cutting
- Easy Handling
- Low Maintenance

30 pounds—5.5 Brake horsepower

Here is the saw for the man who wants *extra, dependable power* for clearing wooded areas or cutting piling and heavy timber. It's the saw that gives you more power per pound than any other one man chain saw on the market.

Pick it up and handle it. You'll be amazed at its light and balanced weight. Pull the starter and see how easily and quickly it starts. But most important, let it get its teeth in a tree and see how lightning fast it cuts. Watch this powerful Homelite purr through a 20-inch trunk in as little as 20 seconds. See how quickly and easily it brings down timber 4 feet or more in diameter.

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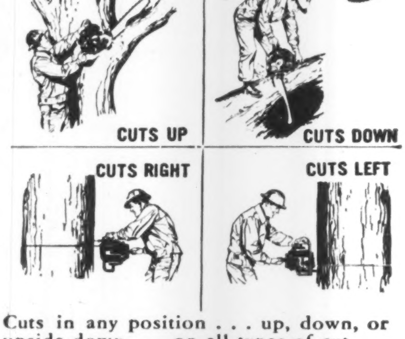

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CONSTRUCTION REPORTS

Bids Asked—Low Bidders—Contracts Awarded—First Section—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager
J. A. MAHONEY, M. O. WETZEL, L. M. WINISKI, M. E. SCIORRA, F. S. DEMBEK, Reports.
J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

BIDS ASKED—HEAVY CONSTRUCTION

MASSACHUSETTS—B.A. 10/13—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston.

Brockton—hy. betterment Rte. 123, $25,000. Plans deposit $5.

Danvers and Middleton—state hy. and bridge reconstr. $102,000. Plans deposit $10.

Plainville—hy. betterment Auto Rte. 1A. $12,000. Plans deposit $5.

Yarmouth—state hy. betterment North Rd. and Mill St. $15,000. Plans deposit $10. H. G. Gray, ch. engr.

▲ Mass., **Brockton**—B.A. 10/14—City, Water Dpt., City Hall, water sys. imprvs., reconstr. Silver Lake Pump Booster Pump Station, cleaning, lining approx. 16 mi. water mains. $1,500,000. Plans deposit $50 refundable. Hayden, Hardin & Buchanan, 810 Park Square Bldg., Boston, engrs. CD 7/8.

▲† Mass., **Chicopee Falls**—MAINTENANCE HANGAR—B.A. 10/20—U. S. Eng., 857 Commonwealth Ave., Boston, concrete, block, steel double cantilever maintenance hangar, Westover Air Force Base, ENG-19-016-54-32. $3,000,000. Plans deposit $25, refundable. Kuljian Corp., 1200 N. Broad St., Phila., Pa., archts. CD 9/18.

† Mass., **Bedford**—DORMITORIES, etc.—B.A. 10/22—U. S. Eng., 837 Commonwealth Ave., Boston, Mass., 2 airmen's dormitories, mess and admin. bldg., Hanscom Air Force Base, ENG-119-016-54-34. $500,000. Plans deposit $50, refundable. CD 9/11.

BIDS ASKED—BUILDINGS

† R. I., **Newport**—LOCKER ROOM—B.A. 10/13—P. Wks. Office, Naval Station, Newport Officer's Locker Room Bldg. 109 alterations, NOY. 79804 (SF), Spec. 38318 (SF). Plans deposit $10.

† R. I., **Newport**—CLUB—B.A. 10/21—P. Wks. Office, First Naval Dist., 495 Summer St., Boston, Mass., alteration and addns. to enlisted men's club, Bldg. 1929, at U. S. Naval Station, Coddington Point, NOY 77810, Spec. 38342. Plans deposit $10.

R. I., **Jamestown**—SCHOOL—B.A. 10/22—Town, A. Miller, supt. Schools, at Clark School, Jamestown, elementary school, Town Recreation Field. $350,000. Plans deposit $50. MacConnell & Walker, 3308 Post Rd., Warwick, archts. CD 10/3/51.

▲ Mass., **Saugus**—SCHOOL—B.A. 10/30—Town, W. E. Lawrence, mgr., Town Hall, high school, Broadway. $1,750,000. Plans deposit $100, refundable. Extended date. S. W. Hayne & Assoc., 336 Main St., Fitchburg, archts. CD 9/16.

SOON LETS CONTRACT—BUILDINGS

Conn., **New London**—CHEMISTRY—Shreve-Lamb & Harmon, archts., 11 E. 44 St., New York, N. Y., soon lets contract chemistry bldg., for Connecticut College, New London, Conn. $300,000.

Mass., **Cambridge**—SALES ROOM and GARAGE—Porter Square Chevrolet Co., 2055 Mass. Ave., soon lets contract 1 story, 222x259 ft. masonry sales room and garage, air-conditioning, Alewife Brook. Saul E. Moffie, 27 School St., Boston, archt.

Mass., **Jamaica Plain**—HOSPITAL—Jewish Tuberculosis Sanitorium of New England, Sinai Hospital, 215 Forest St., soon lets contract hospital addn., alterations, 215 Forest St. $300,000. Curtin & Riley, 45 Newbury St., Boston, archts. CD 9/23.

Mass., **Worcester**—OFFICE—Worcester Mutual Fire Insurance Co., 29 Elm St., soon lets contract home office, 49-51 Elm St. $500,000. L. W. Briggs Assoc., Inc., 90 Park Ave., archts. CD 9/2, under LB.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **Beacon Constr. Co.,** 102 Hano St., Allston, Mass. LB **$259,800,** est. $500,000. constr. well houses, water softening plant, outside pipe lines, ENG.-19-016-54-28, Limestone Air Force Base. LIMESTONE, ME. U. S. Eng., 857 Commonwealth Ave., Boston, Mass. Bids Sept. 25. CD 9/16.

Hillsboro Constr. Co., 700 Mast Rd., Manchester, N. H., LB **$125,000,** Alt. No. 1 minus **$2,300,** est. $107,900, sewage treatment plant, interceptor sewer, State Hospital, WATERBURY, VT. State, State Bldg. Council, Montpelier, Vt. Bids Sept. 23. CD 9/9.

MASSACHUSETTS—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,

George Brox, Inc., 70 Park St., Hudson, Mass. LB **$477,694,** est. $450,000. state hy. and bridge, Rte. 3, Bedford. Bids Sept. 22. CD 9/10.

Carroll Verge & Whipple, Inc., 370 Wahconah St., Pittsfield, Mass. CA Est. **$75,000**. T.V. Bldg., Mount Greylock, PITTSFIELD, MASS. Greylock Broadcasting Co., Station WMGT, c/o Charles L. Pincu, designer, 305 North St., Pittsfield, Mass., CD 9/16/52.

Wes-Julian Constr. Co., 850 Boston-Providence Hy., Dedham, Mass., CA **$267,000,** est. $325,000. Contr. 5, sewage overflow regulators and auxiliary facilities various locations, WORCESTER, MASS. City, P. Wks. Dpt., 20 E. Worcester St., Worcester, Mass. CD 9/2, under LB.

Guerrera & Mancini, P.O. Box 23, Elmwood, Conn., LB, **$178,628,** 16,700 ft. 8- to 12-in. sewers, appurtenances, various streets known as Hawley Sewerage System, Newington, HARTFORD, CONN. City, Bd. Contracts & Supply, 115 Broad St., Hartford, Conn. Bids Sept. 24. CD 9/9.

A. Julian, 106 Bell Court, Bridgeport, Conn., LB, **$102,-955,** Contr. 7, lateral sewers, appurtenances, Broadway District, west of Naugatuck Ave., MILFORD, CONN. Town, Town Hall, Milford, Conn. Bids Sept. 21.

BUILDINGS

LOW BIDS AND CONTRACTS

Tinti's Food Products, Inc., 22 King St., Agawam, Mass. Owner Builds. **$90,000.** FACTORY, AGAWAM, MASS. Munson & Maills, 60 Byers St., Springfield, Mass., designers.

Walsh Bros., 150 Hampshire St., Cambridge, Mass. CA Approx. **$700,000.** 2 story, masonry HIGH SCHOOL Old Colony Parkway, DORCHESTER, MASS. Boston College High School, 150 Old Colony Parkway, Dorchester, Mass. Maginnis & Walsh, 126 Newbury St., Boston, Mass., archts. CD 2/9.

Frankini Constr. Co., Inc., 26 Mystic Ave., Medford, Mass. LB **$803,000**. Mass 200-3. 64 HOUSING units Cherry St., EVERETT, MASS. Everett Housing Auth., H. G. Splane, chn., 48 Elm St., Everett, Mass. Bids Sept. 22. D 9/16.

Wexler Constr. Co., 118 Needham St., Newton, Mass. LB **$304,304,** est. $350,000. Flagg Grammar SCHOOL, Linden St., HOLLISTON, MASS. Town, School Bldg. Comn., Town Hall, Holliston, Mass. Bids Sept. 24. CD 9/9.

E. Turgeon Constr. Co., Inc., 42 Weybosset St., Providence, R. I. CA Est. **$650,000.** INSURANCE BLDG., Waterman St. and Wayland Ave., PROVIDENCE, R. I. Wayland Building Co., c/o What Cheer Mutual Fire Insurance Co., 720 Grosvenor Bldg., Providence, R. I. Bids Aug. 25. CD 8/19.

The Elci Co., 16 Fowler St., New London, Conn., LB **$670,000** South Farms Grade SCHOOL, off Saybrook Rd., MIDDLETOWN, CONN. City School Bldg. Comn., 251 Court St., Middletown, Conn. Bids Sept. 22.

A. F. Peaslee, Inc., 15 Lewis St., Hartford, Conn., CA, **$615,715,** elementary SCHOOL, East St., ROCKVILLE, CONN. Town of Vernon, School Building Comn., Rockville, Conn. Bids Aug. 18. CD 8/31, under CA.

H. U. Bail Sons, Inc., 9 Franklin St., Southbridge, Mass., LB, **$450,000,** HOSPITAL alterations, 37 East St. STAFFORD SPRINGS, CONN. Johnson Memorial Hospital, Inc., 37 East Dq., Stafford Springs, Conn. Bids Sept. 23. CD 9/18.

PROJECTS COVERED

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $34,000; other public works $60,000; industrial buildings $82,000; other buildings $300,000.

Classes of Construction

(Name in order of Listing)

Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Latin America
Public Buildings
Commercial Buildings
Industrial Buildings
Unclassified

Stages Reported

PROPOSED WORK: Including appointment of engineers or architects.

BIDS ASKED (new announcements only). For full calendar, see also preceding issues of ENR.

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects invloved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over.
B.A.	Bids Asked
ENR	Engineering News-Record
CD	Engineering News-Record Construction Daily

MIDDLE ATLANTIC

BIDS ASKED—HEAVY CONSTRUCTION

▲ **NEW JERSEY and PENNSYLVANIA**—B.A. 10/15—At office Joseph K. Costello, secy. Delaware River Port Auth., Administration Bldg., Bridge Plaza, Camden, N. J.

constr. towers and cable anchorage steelwork for suspension bridge over Delaware River connecting Packer Ave. in Philadelphia, Pa. and Gloucester City, N. J., Contract No. 4. Plans deposit $10. CD 9/26/52.

New York—B.A. 10/15—At office B. D. Tallamy, Supt. P. Wks., The Governor Alfred E. Smith State Office Bldg., Albany, landscaping and misc. work incl. constr. of walks and fences, placement of directional signs, stone-block surf. and slope protection along 5.6 mi. Bronx River Parkway, southerly exten. between Bruckner Blvd. and New York City Line, $115,000.

N. Y., **Helmuth**—HEATING—B.A. 10/15—Bureau Contracts & Accounts, The Governor Alfred E. Smith State Office Bldg., Albany, heating work for replacement of steam and return mains, North Group, Gowanda State Homeopathic Hospital. Plans deposit $20. CD 7/11/45, under Public Buildings.

N. Y., **Idlewild**—DISTRIBUTION SYS.—B.A. 10/20—At office Ch. Engr. of The Port of New York Auth., 111 Eighth Ave., New York, Zone 11, furnishing, installing duct banks and sub-station pads and installing cable and sub-station equip. for exten. of 4 kv. distr. sys., New York International Airport, Contr. NYA-320.002. Plans deposit $25. CD 4/27/44.

N. Y., **New York**—B.A. 10/20—Bd. Water Supply, 120 Wall St., Zone 5, Contr. 436, clearing, grubbing middle portion of Pepacton Reservoir, in preparation for storage of water, work will comprise clearing of approx. 1,750 acres, grubbing approx. 550 acres, and required excavation and removal of excremetitious material of Pepacton Reservoir in Towns of Andes and Middletown, Delaware Co. CD 6/16/44.

BIDS ASKED—BUILDINGS

▲ N. Y., **New York**—HOUSING—B.A. 10/14—New York City Housing Auth., 63 Park Row, Zone 38, foundations and general constr., heating and ventilating, electrical work, plumbing, furnishing and installation of elevators for LaGuardia Houses Proj. No. NY-5-21, Sect. I, incl. Bldgs. 4, 5, 7, and 9 in areas in Boro of Manhattan, in block bounded by Montgomery, Monroe, Clinton and Madison St., Bldg. 5 in easterly half of block bounded by Madison, Clinton, Monroe and Jefferson Sts. and Bldg. 4 in easterly half of block bounded by Monroe, Clinton, Cherry and Jefferson Sts. Plans deposit $75, $25 elevators. Extended date. CD 9/10.

N. Y., **Poughkeepsie**—OFFICE, etc.—B.A. 10/15—Bureau Contracts & Accounts, The Governor Alfred E. Smith State Office Bldg., Albany, altering office and shop bldg. (Bldg. No. 1) for Distr. 8, Pleasant Valley Rd. Plans deposit $15.

SOON LETS CONTRACT—BUILDINGS

Pa., **Jeannette**—WAREHOUSE—West Penn Power Co., 14 Wood St., Pittsburgh, soon lets contract 1 and 2 story, 154x263 ft., brick, block, steel warehouse, service bldg., Lincoln Heights, $500,000. Hoffman & Crumpton, Century Bldg., Pittsburgh, archts. CD 3/3, under Commercial Buildings.

Pa., **Midland**—OFFICE—Rem-Cru Titanium, Inc., Midland, soon lets contract 1 story, 82x122 ft., brick, block, steel office, air-conditioning, $300,000. Michael Baker, Jr., Baker Bldg., Rochester, archt.

Pa., **Pittsburgh**—WAREHOUSE—Harris Pump & Supply Co., Sidney St., soon lets contract 1 story, 50x225 ft. block warehouse, $150,000. Franklin Douden & Assoc., 522 Century Bldg., archts. CD 8/14.

Pa., **Wilkensburg**—SCHOOL, etc.—St. Batholomews R. C. Congregation, 10909 Frankstown Rd., soon lets contract 2 story, 57x183 ft., brick, steel, steel parochial school addn. and convent, Penn Twp. $350,000. Marlier & Johnstone, Empire Bldg., Pittsburgh, archts. CD 6/2/52.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **NEW YORK**—Bureau Contracts & Accounts, The Governor Alfred E. Smith State Office Bldg., Albany, Zone 1,

cancelled bids to have been opened Oct. 15, Eastern Thruway Connection, Pt. 1; S.H. 8223-S.H. 766, S.H. 60 Interchanges; Pittsford-Palmyra, Pt. 1, S.H. 766; Despatch-Pittsford, Pt. 2, S.H. 481; Fairport (Brighton-Fairport, Pt. 2) S.H. 60; Proj. U-UG-1107 (1), Contr. 1, FASH. 53-14, FARC. 53-125, Monroe Co., $6,678,000. Will re-advertise; adv. ENR 10/8. CD 9/23.

Bromberger & Carthman, 175 Orawapm St., White Plains, N. Y., LB, **$143,824,** sewerage treatment

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- **UNDERGROUND WATER FLOW into Shafts, Heavy Building Pits, Structures**

TO STOP

- **SETTLEMENT OF FOUNDATIONS**

TO SEAL

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Fred E. Barnett Company
600 Spring Street
Klamath Falls, Oregon

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2700 Fourth Avenue South
Seattle, Washington

L. N. Curtis & Sons
426 W. Third Street South
Salt Lake City, Utah

CANADIAN AGENTS

Fleck Brothers, Limited
110 Alexander Street
Vancouver, B. C., Canada

C. E. Hickey & Sons, Ltd
Hamilton, Canada

plant and sewerage sys., **LAKEHURST, N. J. Boro,** Boro Hall, Lakehurst, N. J. Bids Sept. **17. CD 9/15.**

Consolidated Constr. Co., 28 Cooper St., Woodbury, N. J. LB, **$257,400,** general contract sewage disposal plant SALEM, N. J. City, City Hall, Salem, N. J. Remington & Boyd, 503 Market St., Camden, N. J., engrs. CD 1/21.

R. M. Luff Constr. Co., Willow Grove, Pa., LB **$35,000,** water supply sys., CORNWELL HEIGHTS, PA. Bensalem Twp. Auth., Cornwell Heights, Pa. H. F. Everett & Assocs., Commonwealth Bldg., Allentown, Pa., engrs.-archts.

Stan Seiple, 809 N. 7th Ave., Sunbury, Pa., LB **$305,593,** est. $330,938, sewage treatment plant, LOCK HAVEN, PA. City, City Hall, Lock Haven, Pa. Warren H. Ohl, Court House, Lock Haven, Pa., archt. Bids Sept. 17.

† **Railway Maintenance Co.,** Cumberland and America Sts., Phila., Pa., LB **$104,981,** Dry Dock No. 3, Naval Shipyard, NOY 80628, Spec. 40957, PHILA., PA. Dpt. Navy, Phila. Naval Base, Phila., Pa.

† **MARYLAND**—Bureau P. Rds., Dpt. Commerce, 1440 Columbia Pike, Arlington, Va.

Williams Paving Co., 1269 E. Princess Anne Rd., Norfolk, Va. CA **$875,236.** c. conc., other work 6.359 mi. from ½ mi. north of Good Luck Rd. to Laurel-Bowie Rd., Baltimore-Washington Parkway, Proj. ID5-E5-F6, Prince Georges Co. Bids Sept. 3, awarded Sept. 22. CD 9/9, under LB.

▲ **William C. Frey,** 5501 Lewis Rd., Norfolk, Va. LB **$359,680.** Schedule A, trunk and lateral sewers North Side Pumping Station, etc.;

George & Lynch, Delaware Trust Bldg., Wilmington, Del., LB **$421,000.** Schedule B, South Side Pumping Station and force main water main exten. and units of primary treatment plant;

Frederick Raff Co., 271 Sheldon St., Hartford, Conn. LB **$220,000.** Schedule C, secondary treatment units biofilters and final clarifiers, SALISBURY, MD City, Salisbury, Md. Bids Sept. 18. CD 8/20.

T. Paul Dobson, 412 Shipley Rd., Wilmington, Del., LB, **$70,606,** Eastlake Street paving, WILMINGTON, DEL. City, City Hall, Wilmington, Del. Bids Sept. 22. CD 8/26.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Castagna & Sons, Inc.,** 14 Kenwood Court, Rockville Center, N. Y., CA **$1,049,497,** Contr. 1A, foundation and structural steel work, for constr. of City PRISON and REMAND SHELTER, Atlantic **Ave., Boerum Pl.,** Smith and State Sts., **BROOKLYN, N. Y.** Dpt. P. Wks., Municipal Bldg., **New York 7, N. Y. CD** 8/14, under LB.

▲ **Arlington Constr. Co., 521 Fifth Ave., New York 17,** N. Y. Owner Builds. **$1,000,000.** SHOPPING CENTER, on 7-acre site on **west side of Central Ave., north of** Ardsley **Rd. to be called Midway Shopping Center,** GREENVILLE, **N. Y. Burnett V. Vickers, 14** Mamaroneck Ave., **White Plains, N. Y.,** archt.

▲ **Calabro Constr. Co., Inc.,** Park Avenue South, Linden, N. J., CA **$1,275,000,** general contract;

August A. Arace & Sons., Inc., 642 Third Ave., Elizabeth, N. J. CA **$701,389,** heating and ventilating, LIBRARY, NEW BRUNSWICK, N. J. Rutgers University, New Brunswick, N. J. CD 11/20/47.

Somers Constr. Co., Cynwyd, Pa., LB **$322,621. Paoli** Elementary SCHOOL addn., Paoli, BERWYN, PA. Tredyffrin Twp. School Dist., Berwyn, Pa. Bids Sept. 17. CD 9/2.

F. K. Campion, 1905 Spring Garden St., Phila, Pa. LB **$443,000.** general contract. Westbrook Park Grade SCHOOL, CLIFTON HEIGHTS, PA. Upper Darby School Bd., Upper Darby, Pa. Sauter & Castor, 1411 Walnut St., Phila., Pa., engrs. CD 7/14.

J. S. Simons Co., 731 S. Negley St., Pittsburgh, Pa. LB **$300,000.** 1 and 2 story, brick, steel, grade SCHOOL, FREEPORT, PA. Freeport Area Joint School Dist., Freeport, Pa. Bids Sept. 21. CD 9/17

H. T. Osborn Co., Inc., 631 12th St., Franklin, Pa. CA **$500,000.** brick, steel WAREHOUSE, OIL CITY, PA. Jones & Laughlin Steel Corp., Oil City, Pa.

William F. Lotz, Inc., Adams Ave. and Orthodox St., Phila., Pa., CA **$750,000.** HOME addns., alterations PHILA., PA. Lutheran Home for Orphans & Aged, 6950 Germantown Ave., Phila., Pa

Korman-Marx Corp., 4954 Rising Sun Ave., Phila., Pa. Separate Coutracts **$460,000.** RESIDENTIAL DEVELOPMENT, Sloan St., etc. RIDLEY PARK, PA. Erling PA. Irvin Michaelson, 1612 Market St., Phila., Pa., archt.

Kelly & Veitz, 1720 S. State Rd., Upper Darby, Pa. Separate Contracts. **$320,000.** RESIDENTIAL DEVELPMENT, Sloan St., etc. RIDLEY PARK, PA. Erling Wenge, McClatchy Bldg., Upper Darby, Pa., archt.

Fairchance Lumber Co., Fairchance, Pa., LB **$555,371.** 1 story, L-shaped, 183x171x291x88 ft. brick, block Hatfield Grade SCHOOL, Derrick Ave., S. Union Twp., UNIONTOWN, PA. South Union School Dist. Auth., Uniontown, Pa. Altman & Altman, 205 Derrick Ave., Uniontown, Pa., archts. Bids Sept. 17.

▲† **John A. Volpe Constr. Co.,** 1507 M St. N.W., CA **$1,199,619,** Base Bid incl. Alternates E, F, and G, BIOLOGY-GREENHOUSE BUILDING at Howard University, WASH, D. C. General Services Administration, P. Bldg. Service, General Services Bldg., 19 and F Sts. N.W., Wash., D. C. Bids Aug. 28, awarded Sept. 25. CD 9/2, under LB.

† **W. & M. Chappel, Inc.,** 49 Place and Edgewood Rd., Hollywood, Md., LB, **$530,000,** POWER PLANT at U. S. Soldiers' Home, CIVENG-49-080-54-1, WASH., D. C. U. S. Eng., First and Douglas Sts. N.W., Wash., D. C. Bids Sept. 24. CD 8/31.

Ernest Di Sabatino & Sons, 2601 W. 4 St., Wilmington, Del., LB, **$627,300,** West Park Place Elementary

SCHOOL, NEWARK, DEL. Newark Special School Dist., Newark, Del. Bids Sept. 16. CD 9/15.

SOUTH

BIDS ASKED—HEAVY CONSTRUCTION

† **Fla., Mayport**—DREDGING—B.A. About 10/16—U. S. Eng., P. O. Box 4970, Jacksonville, maintenance dredging of turning basin, U. S. Naval Auxiliary Air Station, CIVENG-08-123-54-14. CD 9/8/49.

FLORIDA—B.A. 10/27—State Road Dpt., Tallahassee,

Brevard Co.—1,800.5 ft. concrete deck girder bridge on 18 in. concrete piling, incl. 220 ft. electrically operated plate girder swing span, 24 ft. wide and 3 ft. sidewalk on each side, control house, treated timber fender sys., navigation lights, electrical equip., approach slabs 1,920.5 ft. State Road No. 3, at Eau Gallie Bridge across Indian River (Intra-Coastal Waterway) Job 7012-104. $825,000. Plans deposit $25. Sam P. Turnbull, state hy. engr.

SOUTH CAROLINA—B.A. 10/27—State Hy. Dpt., Columbia,

Charleston Co.—engineering services in connection with double leaf bascule superstructure and supporting piers for Wappo Cut Bridge over Intracoastal Waterway, near Charleston; adv. ENR 10/8. CD 710/52.

West Virginia—UTILITY BUILDINGS, etc.—B.A. 10/27—West Virginia Turnpike Comn., 1340 Wilson St., Charleston, Zone 5, Contract No. 44 permanent utility bldgs. with mechanical services at Beckley, Charleston, Chelyan, Kanwaha City, and removal, relocation, alteration 2 temporary field office bldgs. presently located at Bluestone Bridge and Turnpike Mile 47 to Princeton Interchange and Mossy Interchange respectively. Howard, Needles, Tammen & Bergendoff, P. O. Box 5266, Capitol Station, Charleston, engrs.; adv. ENR 10/8. CD 4/20/52, under Streets and Roads.

† **La., Lake Charles**—HOSPITAL—B.A. About 10/29—U. S. Eng., Box 1229, Galveston, Tex., hospital exten., Lake Charles Air Force Base, ENG-41-243-54-14, $100,000-$500,000. Extended date. CD 8/19.

BIDS ASKED—BUILDINGS

▲ **Ala., Huntsville**—TEST FACILITIES—B.A. 10/27—U. S. Eng., P.O. Box 1169, Mobile, Zone 7, guided missile test facilities, No. 01-076-54-12. $3,500,000. Parsons Aerojet Co., 411 W. 5 St., Los Angeles, Calif., archts. CD 11/30/51.

† **Ky., Fort Knox**—HOSPITAL—B.A. 11/17—U. S. Eng., 830 W. Broadway, Louisville, Zone 3, 500-1,000 bed U. S. Army Hospital, ENG-15-029-54-1. Plans deposit $100. CD 6/27/51.

SOON LETS CONTRACT—BUILDINGS

N. C., Greensboro—PLANT—Guilford Dairy Co-operative Assoc., Greensboro, soon lets contract ice cream plant. Mann & McLawhorn, Greensboro, archts.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

WEST VIRGINIA—West Virginia Turnpike Comn., 1340 Wilson St., Charleston, Zone 5,

C. F. Rule Contr. Co., 217 13 Ave. N., Nashville, Tenn., CA, **$668,838**, Contract 35, rein.-con. bridge decks and pipe handrail on 13 bridges, Fayette and Kanawha Counties. Bids Sept. 10, awarded Sept. 14. CD 9/16, under LB.

WEST VIRGINIA—State Road Comn., 1800 Washington St. E., Charleston,

Frederick Engr. Co., P.O. Box 2078, Huntington, W. Va., CA, **$90,938**, substructure Contract No. 1 (Sect. 12/4) 2 concrete abutments and 4 concrete piers Henlawson Br. S-1854, S.P. 6518, Logan Co. Bids Sept. 22, awarded Sept. 22. CD 9/14.

WEST VIRGINIA—State Road Comn., 1800 Washington St. E., Charleston.

J. M. Francesa & Co., Fayetteville, W. Va., LB, **$314,804**, five span group and six span group 670 ft. steel spans, rein.-con. deck, substructure Island Creek Overhead 1855, F.A.P. F-150 (3), Logan Co. Bids Sept. 22. CD 9/14.

WEST VIRGINIA—State Road Comn., 1800 Washington St. E., Charleston.

Smith Constr. Co., P.O. Box 392, Huntington, W. Va., LB, **$162,601**, c. conc. 1.458 mi. Huntington Le Sage Rd. (W. Va. 2) F.A.P. F-321 (5), Cabell Co. Bids Sept. 22. CD 9/14.

United Fuel Gas Co., 1033 Quarrier St., Charleston, W. Va., Own Forces, **$75,000**, Lanham Compressor Station, Kanawha **Co., WEST VIRGINIA**. CD 3/13.

LOUISIANA—State Hy. Dpt., Highway Office Bldg., Baton Rouge,

Anderson & Courtney, Box 163, Amite, La. LB **$84,617.** bit. surf. tr. (asph. cement) 5.597 mi. Kentwood-Mississippi State Line Hy., State Rte. 1057 and 1057D, S.P. 853-27-04, Tangipahoa Parish;

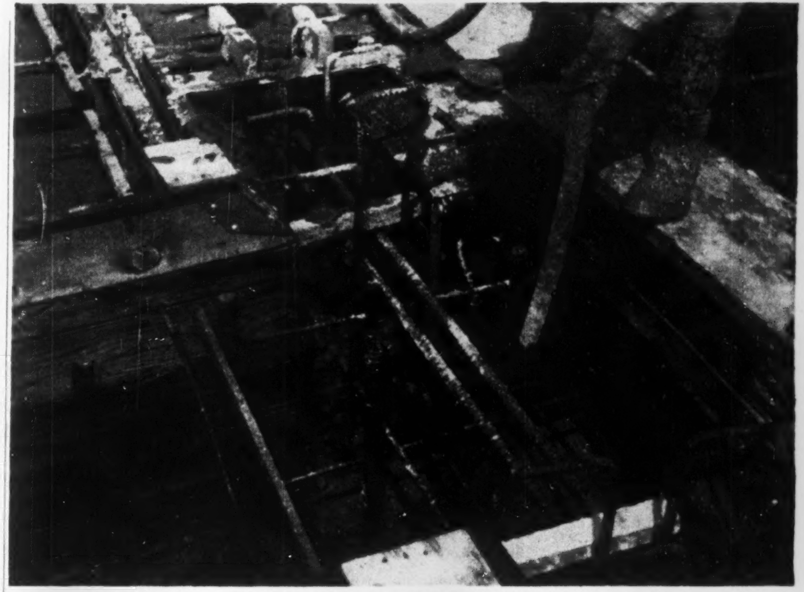
Walden & Williams, Box 738, Mansfield, La. LB **$117,755.** bit. surf. tr. (asph. cement) 8.52 mi. Alpha-Martin Hy., State Rte. 225, S.P. 304-01-05, Red River Parish. Bids Sept. 16. CD 9/10.

James Jessup, Depoy, Ky. LB Bids (1) **$99,973** (2) **$90,434** (3) **$70,048**. earth fill dam for Fish & Wildlife Preserve, KENTUCKY. State, Frankfort, Ky. Bids Sept. 15.

Coleman-Trainor & Co., Box 1477, Huntington, W. Va. LB **$69,605**, Contr. A water distr. sys.; LB **$72,000**, Contr. B filter plant;

Henderson-Hite Co., Bardstown, Ky. LB **$34,447**. Contr. D dam and intake, STANFORD, KY. City, Stanford, Ky. Bids Sept. 17. CD 9/10.

Advertisement



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Appearance of sheen on the surface of the concrete gives visual indication that vibration is complete. With the modern high frequency vibrators pioneered by VIBER this requires only about 10 to 30 seconds, depending on the characteristics of the concrete.

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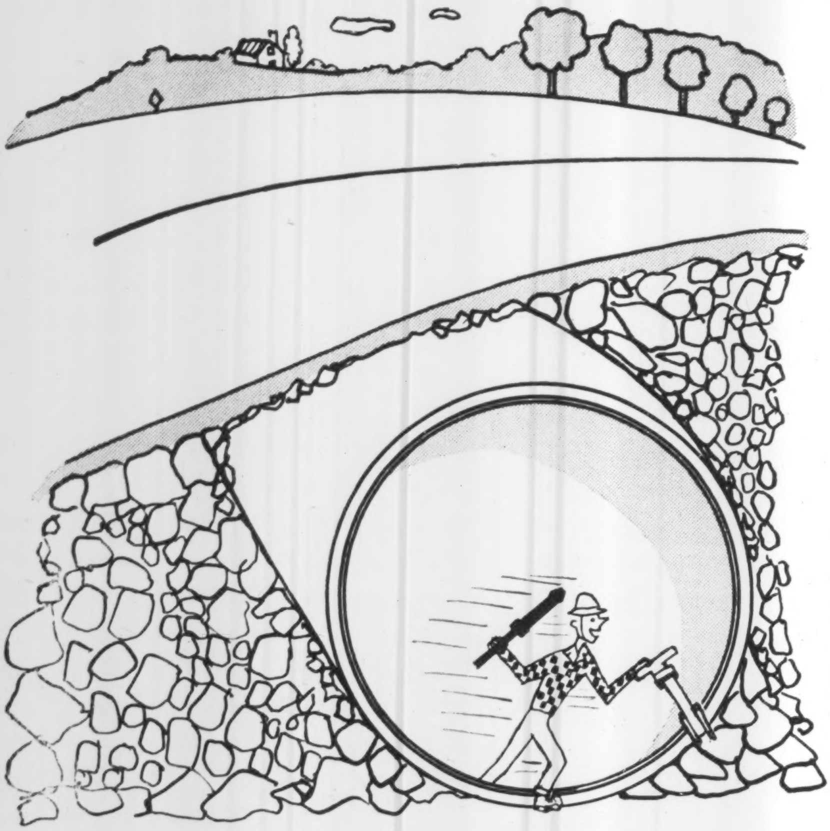

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BUILDINGS

LOW BIDS AND CONTRACTS

† **McKoy-Helgerson Co.**, P. O. Box 57, Greenville, S. C. LB **$963,756**, HELIPORT, WAREHOUSE, hangar and SHOPS ADMIN. and OPERATIONS BLDG. and utilities, ENG-44-110-53-3, FORT EUSTIS, VA. U. S. Eng., foot of Front St., Norfolk, Va. Bids Sept. 24. CD 9/2.

Van De Riet Constr. Co., 521 W. 25 St., Norfolk, Va. CA, **$249,399**. 1 story, 70x280 ft. masonry municipal GARAGE, NORFOLK, VA. City, City Hall, Norfolk, Va. Bids Aug. 14. CD 8/19, under LB.

Frank L. Blum & Co., 860 W. 4½ St., Winston-Salem, N. C. LB **$454,582**, AUDITORIUM-COLISEUM, WINSTON-SALEM, N. C. Winston Salem Foundation, Wachovia Bank & Trust Co., Winston-Salem, N. C. Bids Sept. 16. CD 8/28.

F. W. Owens Co., 119 N. Fifth St., Louisville, Ky. LB **$572,340** general contract Wayne Waggener County SCHOOL, near LOUISVILLE, KY. Jefferson Co. Bd. Educ., W. Jefferson St., Louisville, Ky. Bids Sept. 24. CD 9/9.

MIDDLE WEST

BIDS ASKED—HEAVY CONSTRUCTION

O., Youngstown—B.A. 10/15—City, J. Emerson Davis, City Bldg., approx. 6,300 ft. 36 in. water main, from Tod and West Aves. to Myrtle Ave. pumping station. Plans deposit $10.

Wis., Green Bay—B.A. 10/19—City, City Hall, water supply system, incl. **(A)** 6,000 ft. 42 in. into Lake Michigan; **(B)** furnish 58,884 ft. 36 in. and 76,900 ft. 42 in. pipe; **(C)** laying pipe. Plans deposit $25. Alvord, Burckick & Howson, 20 N. Wacker Dr., Chicago 6, Ill., engrs. CD 6/18/52.

BIDS ASKED—BUILDINGS

Ind., Fort Wayne—SCHOOL—B.A. 10/13—Bd. Trustees, School City of Fort Wayne, 1230 S. Clinton St., brick, concrete, steel school, Vance and Kentucky Aves. Plans deposit $25. Humbrecht & Assoc., 116 W. Rudisill Blvd., archts. CD 4/23.

▲ **Ill., Chicago**—PARKING GARAGE—B.A. 10/19—City, City Hall, 12-level parking garage, 120 N. LaSalle St., opposite City Hall, DeLeuw, Cather & Co., 150 N. Wacker Dr., Zone 6, engrs. Friedman, Alschuler & Sincere, 223 Jackson Blvd., Zone 6, archts. CD 2/27.

Mich., Hastings—SCHOOL—B.A. 10/22—Bd. Educ., Hastings, brick, steel, concrete high school, gymnasium, shops addn. $600,000. Louis C. Kingscott & Assoc., Inc., 411 Monroe St., Kalamazoo, archts. CD 6/3.

O., Piketon—GARAGE—B.A. 10/23—Dpt. P. Wks., Ohio Dpts. Bldg., Columbus, Pike County Highway Garage. Plans deposit $5. H. G. Allen, c/o owner, cons. archt.

Wis., La Crosse—SCHOOL—B.A. 10/29—Bd. Educ., 1 story, part bsmnt., T-shaped, 208x228 ft. elementary school. Boyum, Schubert & Sorenson, Hoeschler Bldg., archts. CD 10/14/52.

Ill., Chicago—PLANT—Bids Asked—National Casket Co., 1911 Roosevelt Rd., plant alterations, addns. $125,000. Friedman, Alschuler & Sincere, 223 Jackson Blvd., Zone 6, archts.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **OHIO**—Ohio Turnpike Comn., 139 E. Gay St., Columbus, Zone 15,

Fort Pitt Bridge Works, Sheraton Hotel, Pittsburgh, Pa. CA **$1,272,832**, Contr. M-6B, 4,480 tons fabricated structural steel for three road sects., Cuyahoga Co. Bids Sept. 9. CD 9/11, under LB.

▲ **OHIO**—Ohio Turnpike Comn., 139 E. Gay St., Columbus, Zone 15,

Frank Mashuda Co., Greentree Rd., Pittsburgh, Pa., CA **$11,114,070**, 13.9 mi. Sects. 8, 9 and 10, of Ohio Turnpike, Trumbull and Portage Counties. Bids Sept. 9. CD 9/11, under LB.

▲† **George Sheaf & Co.**, 449 Neilston St., Columbus, O. LB **$5,543,565, est.** $5,664,393, five story 314-500-beds with maternity facilities HOSPITAL, Wright-Patterson Air Force Base, ENG-14-029-54-12, DAYTON, O. U. S. Eng., 830 W. Broadway, Louisville 3, Ky. Bids Sept. 22. CD 8/31.

▲† **Shelby Constr. Co.**, 1106 Canal St., New Orleans, La., CA **$3,029,000**. electronics maintenance bldg. and warehouse, Gentile Air Force Base, DAYTON, O. U. S. Eng., 830 W. Broadway, Louisville, Ky. Bids Sept. 9, awarded Sept. 15. CD 8/31.

Harris & McBurney, Jackson, Mich. LB **$156,067**, est. $135,000, power lines and lighting for runways, taxiways and aprons, Oak Openings Airport, TOLEDO, O. City, City Hall, Toledo, O. Stepleton, McDonnell & Barber, Colton Bldg., Toledo, O., engrs. Bids Sept. 22. CD 4/14.

INDIANA—State Hy. Comn., State House Annex, Indianapolis, Zone 4,

Kahl & Mahon, Liberty, Ind., LB, **$78,994**, est. $93,767, 1 span 40 ft. rein.-con. girder bridge over Lones Ditch, north of Warsaw, Kosciusko Co.;

McCalman Constr. Co., Danville, Ill., LB, **$95,771**, est. $109,008, 1 span 40 ft. steam beam bridge over Prue Ditch north of Kentland and rein.-con. girder abutment exten. over Hunter Ditch, east of Goodman, Newton Co.;

Kahl & Mahon, Liberty, Ind., LB, **$93,599**, est. $109,076, 3 span 96 ft. rein.-con. girder bridge, northwest of Monticello, White Co. Bids Sept. 22. CD 9/8.

▲ **INDIANA**—State Hy. Comn., State House Annex, Indianapolis, Zone 4,

Rieth-Riley Constr. Co., Goshen, Ind., LB, **$234,702**, Est. $236,809, c. conc. and base wid'n, c. conc. and hot b. conc. resurf. 0.177 mi. Goshen and 3.705 mi. near Benton, Elkhart Co.;

rejected bids Sept. 22, c. conc. 7.482 mi. Huntingburg, Pike and Dubcis Counties, LB, **$744,413**; imprv. 0.345 mi. Versailes and 3.858 mi. Osgood, Ripley Co., LB, **$145,397**. CD 9/8.

ILLINOIS—State Div. Hys., Springfield,

Michael J. McDermott & Co., 30 N. LaSalle St., Chicago, 2, Ill., CA, **$591,451**, substructure, erecting structural steel for grade separation on Leavitt St. over Congress St. Expressway F.A. 131, Cook Co. Bids Sept. 11, awarded Sept. 23. CD 9/17 under LB.

Bituminous Paving Co., 2501 S. Salt St., Chicago, Ill., LB, **$104,855**, b. conc. S. Indiana Ave. from 35 to 22 St., CHICAGO, ILL. City, City Hall, Chicago, Ill. Bids Sept. 22. CD 9/16.

N. M. Isabella, Inc., 741 Market Pl., Madison, Wis., LB, **$78,920**, paving warm-up pads, Truax Field, MADISON, WIS. City, City Hall, Madison, Wis. Bids Sept. 22.

Greenfield Constr. Co., 16596 Greenfield St., Detroit, Mich., CA **$659,851**, est. $780,000. water sewer power and lighting John C. Lodge Expressway, Ohio to Dexter Ave., BUI 82-128 C4 (BUI 404 64), Wayne Co., MICHIGAN. State Hy. Dpt., 222 Townsend St., Lansing 13, Mich. CD 8/23, under LB.

MICHIGAN—State Hy. Dpt., 222 Townsend St., Lansing, Zone 13,

Louis Garavaglia, 24240 Mound Rd., Center Line, Mich. CA **$819,736**, est. $880,000. bridge on Woodward over Edsel Ford Expressway, bit. conc. deck, removal of car tracks, sewers, power and light, rein.-con. walls, BUI E41 of 82-22-10 C1-U (BUI-391 50), Wayne Co. CD 9/23, under LB.

▲ **MICHIGAN**—State Hy. Dpt., 22 Townsend St., Lansing, Zone 13,

Denton Constr. Co., 7-170 General Motors Bldg., Detroit, Mich. and **Louis Garavaglia**, 24240 Mound Rd., Center Line, Mich. CA **$1,464,426**, est. $1,600,000. 36 ft. c. conc. ramps, roads, utilities from Linwood to Commonwealth Sts., BUI 82-65 C11-U (BUI 391 58), BUI 82-66 C11-U (BUI 391 34), Wayne Co.;

Alpine Constr. Co., St. Ignace, Mich., CA **$615,629**, est. $620,000. stabilized aggregate on M-68, M 71-17 C3-U, M 71-17 C4-U (F 296 1), M 71-17 C5-R (F 296 1), Presque Isle Co.;

Sargent Constr. Co., 2840 Bay Rd., Saginaw, Mich. CA **$636,675**, est. $700,000. c. conc. 6.463 mi. F 15-7 C6-R (F 46 3), F 15-7 C7-R (F 46 3), Charlevoix Co. Grand total $2,716,730. CD 9/23, under LB.

Greenfield Constr. Co., 16596 Greenfield St., Detroit, Mich. LB **$490,000**, est. $500,000. Wilkie Drain Trunk Sewer Arm No. 1 Huron, Ripp and Hayes connections, Taylor, DETROIT, MICH. Wayne Co., **C. J. Mulle**, drain comr., 3800 Cadillac Tower, **Detroit**, Mich. Bids Sept. 22. CD 9/15.

Herman Gundalch, Inc., Houghton, Mich. CA **$105,607**, est. $160,000. artificial skating rink Michigan College of Mining and Technology, HOUGHTON, MICH. State, A. N. Langius, dir. State Bldg. Dpt., Lansing, Mich. Bids Aug. 31. CD 8/6.

BUILDINGS

LOW BIDS AND CONTRACTS

Dawson-Evans Constr. Co., 5300 Vine St., St. Bernard, O., LB **$699,000**. 4 story brick, rein.-con. DORMITORY, Ledgewood Ave., CINCINNATI, O. Xavier University, Dana Ave., Cincinnati, O. Bids Sept. 24. CD 9/24.

Bluff Heights, Inc. & Quay Heights, Inc., 542 N. High St., Columbus, O. Owner Builds. **$416,000**, 25 double frame DWELLINGS, in Grandview Heights Corp., COLUMBUS, O.

J. and L. Realty Co., 801 Lemcke Bldg., Indianapolis 5, Ind. Owner Builds. **$350,000** HOMES in third section of Ralston Heights, INDIANAPOLAS, IND.

▲ **Stanley Realty Co.**, 701 Union Title Bldg., Indianapolis, Ind. Owner Builds, **$1,000,000**, 50 HOMES in College Ave. Area, INDIANAPOLIS, IND.

Home Place Realty Co., 1150 Castle Row, Indianapolis, Ind. Owner Builds, **$450,000**, row of HOMES in Westmore Heights, INDIANAPOLIS, IND.

▲ **ABC Construction Co.**, 5235 Winthrop Ave., Indianapolis, Ind. Owner Builds, **$1,000,000**, 100 HOMES in Brookhaven Subdivision, INDIANAPOLIS, IND.

Dawdon Construction Co., 1105 E. 52 St., Indianapolis, Ind. Owner Builds. **$350,000**, 25 HOMES in Kesslerwood Addn., INDIANAPOLIS, IND.

Carl E. Erickson Co., 5657 N. Ravenswood St., Chicago, 40, Ill., CA, **$150,000**, 2 story PLANT addn., CHICAGO, ILL. Kentile, Inc., 4532 S. Kolin St., Chicago, Ill. A. Epstein & Sons Co., 2011 Pershing Rd., Chicago, Zone 9, archts. Awarded Sept. 17.

Continental Constr. Co., 340 N. Central Ave., Chicago, Ill., CA, **$100,000**, FACTORY, 9148 King St., FRANKLIN PARK, ILL. W. J. Dennis Co., 4444 Irving Park Ave., Chicago, Ill. Awarded Sept. 16.

Meredith Bros. Co., 939 S. 2 St., Milwaukee, 4, Wis. CA **$195,000**, 1 story, 201x209 ft., WAREHOUSE and OFFICE, MILWAUKEE, WIS. Firestone Tire & Rubber Co., 518 N. Jefferson St., Milwaukee, 2, Wis. Bids Sept. 11. CD 9/2.

Gahan & Sons, Port Washington, Wis., CA, **$200,000** 1 story, 33,000 sq. ft., steel, brick, blocks SHOP and OFFICE addn., PORT WASHINGTON, WIS. Bolens Products Div., Food Machinery & Chemical Corp., 215 S. Park St., Port Washington, Wis. O. D. Kempf & W. J. Blong, 125 E. Main St., Port Washington, Wis., engrs. and archts.

Lerner-Linden Constr. Co., 9940 Roselawn St., Detroit, Mich. CA **$780,918**. general contract third unit, brick, steel, concrete 767,600 cu. yd. Frank Cody

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high SCHOOL, DETROIT, MICH. City, Bd. Educ., 1354 Broadway, Detroit, Mich. Bids Sept. 17. CD 9/3.

Bernard Oard & Sons, Rose City, Mich. CA Est. **$100,000.** five 40x100 ft., stran-steel STORAGE BLDGS., ITHACA, MICH. Owner, c/o contractor.

L. E. Smith Building Co., 16335 Harper St., Detroit, Mich. Owner Builds. **$300,000,** brick ranch HOMES, near Metropolitan Beach Parkway, on Harper Ave., MOUNT CLEMENS, MICH.

Cunningham-Limp Co., 3087 W. Grand Blvd., Detroit, Mich. CA **$315,000.** 1 story, 42,000 sq. ft. brick FACTORY, PLYMOUTH, MICH. Dunn Steel Div. Townsend Co., F. R. Dickinson, pres., Plymouth, Mich. Lyle Zisler & Assoc., 628 McKerchney Bldg., Detroit, Mich., archts.

Cunningham-Limp Co., 3087 W. Grand Blvd., Detroit, Mich. CA Est. **$350,000.** 3 story, brick, steel PLANT OFFICE EMPLOYEES BLDG., CAFETERIA, ROCHESTER, MICH. Detroit Broach Co., Inc., Gustav von Reis, pres., 20201 Sherwood St., Detroit, Mich. Lyle Zisler & Assoc., 628 McKerchney Bldg., Detroit, Mich., archts.

Harold D. Colwell, 17929 Birmingham St., Birmingham, Mich. Owner Builds. **$600,000.** 70 single HOMES, 11 Mile Rd. between Lorenz and Couzens Sts., ROYAL OAK, MICH.

David L. Green Constr. Co., Fairview St., Muskegon, Mich. CA **$361,486.** general contract 2 story, brick, steel Senior High SCHOOL, WHITEHALL, MICH. Bd. Educ., Whitehall, Mich. Bids Sept. 11. CD 8/31.

WEST OF MISSISSIPPI

BIDS ASKED—HEAVY CONSTRUCTION

TEXAS—B.A. 10/20—State Hy. Comn., Austin,
Grayson Co.—M. K. T. R.R. overpass and approaches 0.273 mi. HY. F.M. 120 between Pottsboro and Denison, Control No. C 728-1-3.
Jefferson Co.—T. & N. O. and G. C. & S. F. R.R. overpass in Beaumont, 0.295 mi. Hy. U. S. 90 from Averill St. to near 8th St. in Beaumont, Control No. 28-13-8. FP No. UGI-56 (6).
Lamar, Delta and Fannin Counties—structures 0.106 mi. Hy. F.M. 38, 64, 79, 128 and 271, 2.5 mi. south of Roxton, Lamar Co.; 10.6 mi. west S-24 in Cooper, Delta Co.; 2.9 mi. to 12.6 mi. northwest of U.S. 82 in Paris, Lamar Co.; between Cooper and Ben Franklin, Delta Co.; 4.2 mi. southeast of S-78 south of Bonham, Fannin Co.

TEXAS—B.A. 10/20—State Hy. Comn., Austin,
Bexar Co.—grading, structures, base and surf. 16.102 mi. Hy. F.M. 471, 1518, 1980 and 1976, from F.M. Hy. 471 from Galm Rd. to Rogers Rd. and F.M. Hy. 1518 from S.H. 346 to Somerset and F.M. Hy. 1980 from F.M. 1516 to Stuart Rd. and F.M. Hy. 1976 from U.S. 81 Int. to Gibbs-Sprawl Rd.
Baylor Co.—wid'n. flexible base and b. conc. 11.635 mi. Hy. U.S. 277, from 1.3 mi. southwest of U.S. 283 to Knox Co. line, Control No. C 157-1-21.
Brazos and Washington Counties—flexible base and b. conc. 6.788 mi. Hy. S.H. 90, from west approach of Navasota River Bridge to conn. with present S.H. 90 at Sommers Gin, Control No. C-315-5-17 and 315-6-7. FP No. F 1084 (6).
Crosby Co.—grading, structures, base, surf. 10.673 mi. Hy. FM 1063 and 651 from 3 mi. east of Cone, east to intersection of F.M. 651 and from Floyd Co. line south 5.149 mi. Control No. 1254-2-2 and 806-2-5. FP No. S 1458 (1) and S 1051 (2).
Hays Co.—grading, structures, base and surf. 8.976 mi. Hy. F.M. 2001 from U.S. 81 near Buda to S.H. 21 at Niederwald, Control No. C 1776-2-1.
Hill Co.—grading, structures, base and surf. 8.994 mi. Hy. F.M. 712 from Itasca, northeast via Pleasant Hill to U.S. Hy. No. 81, Control No. 1661-2-1, FP No. S 1618 (1) and C 1661-2-2.
Polk Co.—grading, structures, base and surf. 7.56 mi. Hy. F.M. 1988, from U.S. Hy. 59 in Goodrich northwest via Swarthout and northeast to Mount Rose, Control No. 1876-1-1. FP No. S 1864 (1).
Rusk Co.—grading, structures, base and surf. 6.498 mi. Hy. F.M. 1798, from Jct. F.M. Hy. 839, 14 mi. southwest of Henderson, east to Jct. F.M. Hy. 225 at Laneville, Control No. 1670-1-1. FP No. S 1637 (1).
Tarrant Co.—grading, structures, base and surf. 8.35 mi. Hy. F.M. 1709 from Keller east to Junction S.H. 114 near Grapevine, Control No. 1603-3-1. FP No. S 1536 (1).

† **Tex., Big Spring**—HANGAR, etc.—B.A. 10/20—U. S. Eng., Box 1538, Albuquerque, N. M. **(A)** 124x238 ft. steel frame, masonry panel hangar with shop, $250,000-$400,000 **(B)** 120x228 ft., steel frame, masonry base maintenance shop, $250,000-$450,000 **(C)** utilities, sewers, gas, water, steam lines and electrical lines, $189,000 **(D)** hard-type paved roads, streets, parking areas, $150,000; Webb Air Force Base, Serial No. Eng-29-005-54-27. CD 9/23.

TEXAS—B.A. 10/21—State Hy. Comn., Austin,
Galveston Co.—imprvs. on approaches to Causeway, 0.966 mi. Hy. U.S. 75, from Teichman Rd. in Galveston to G. C. & S.F. R.R. overpass (Sect.), Control No. C 500-1-29.
Lamar Co.—structures 0.039 mi. Hy. F.M. 195, from 3.4 mi. to 6.3 mi. northeast of U.S. Hy. 82 in Paris.

TEXAS—B.A. 10/21—State Hy. Comn., Austin,
Denton Co.—grading, storm sewers, T. & P. underpass and c. conc. 0.661 mi. Hy. U.S. 77, from Locust St. in Denton to south city limits, Control No. 196-1-10 and 11. FP No. FG-117 (8) and F-117 (9).

Henderson Co.—grading, structures, base and surf. 8.543 mi. Hy. F.M. 314, from end of present F.M. 314 to Ints. with F.M. 315, Control No. C. 1789-1-2.

(Continued on page 320)

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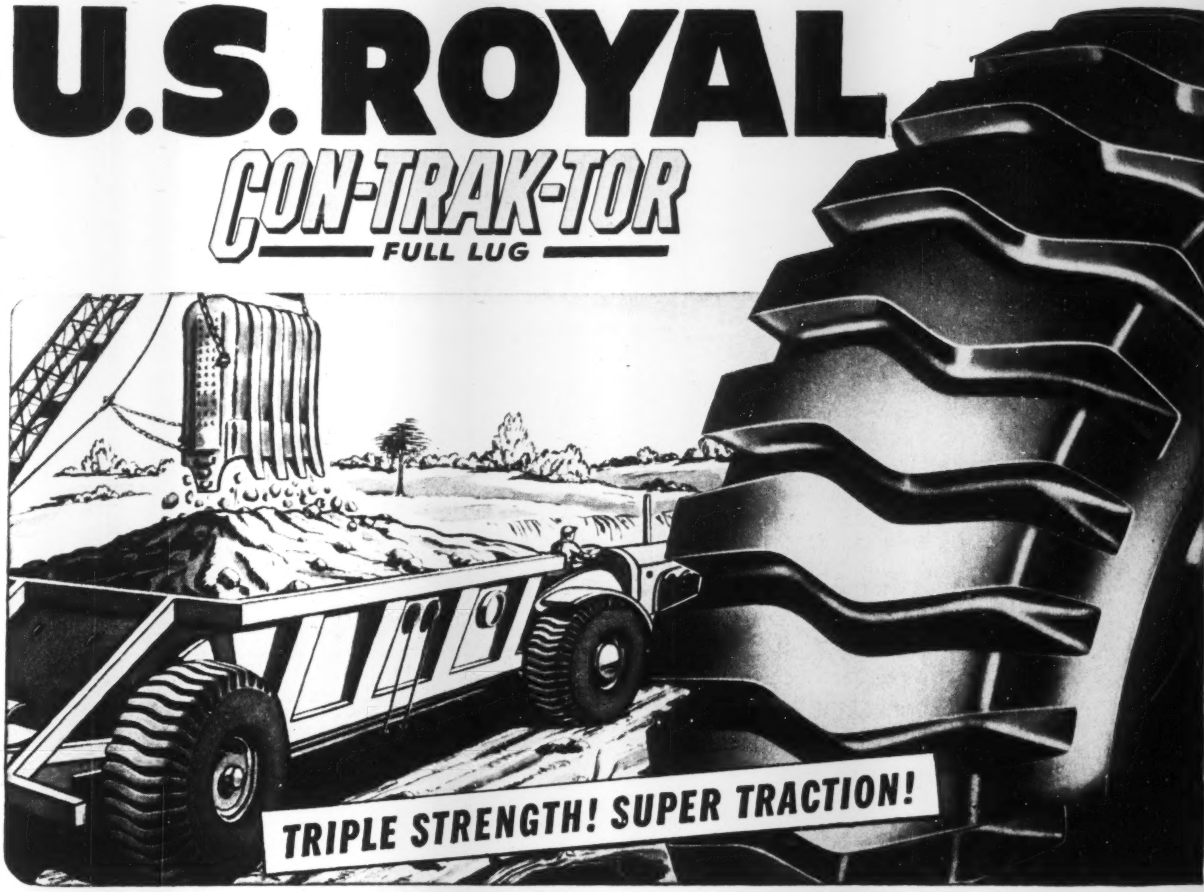
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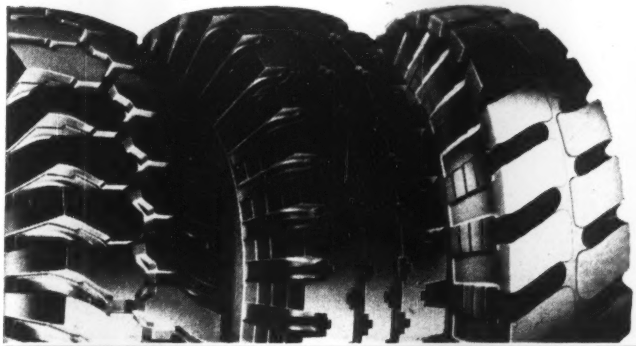

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(Continued from page 318)

Karnes Co.—grading, structures, base and surf. 12.934 mi. Hy. FM 887, 81 and 1354, from St. Hy. 123 and FM Hy. 887 in Pawelekville to St. Hy. 80 in Gillett and lengthen Ecleto Creek and Dry Ecleto Creek bridges, Control No. 1122-2-2, FP No. S 1419 (2), C 691-1-7 and C 1422-1-2.

Lamar Co.—grading, structures, base and surf. 5.911 mi. Hy. FM 196, from Blossom to Pattonville, Control No. 680-8-1. FP No. S 1033 (2).

Lee Co.—grading, structures, base and surf. 8.607 mi. Hy. FM 1985 and 1624, from U.S. 290 in Giddings 7.3 mi. northeast towards Dimebox and from St. Hy. 21 to U.S. Hy. 77, Control No. 334-5-2. FP No. S 1874 (1) and V 1537-1-3.

Scurry Co.—grading, structures, base and surf. 7.046 mi. Hy. FM 1610, from Borden Co. line to F.M. 1606, Control No. V 1531-2-1.

Tarrant Co.—grading, bridge and c. conc. 1.254 mi. Highway Access Rd., from SH 183 to Carswell Air Force Base, Control No. 902-24-4, FP No. AD-5, Contr. 2.

grading, structures, base and surf. 4.029 mi. Hy. F.M. 1886, from Tarrant-Parker Co. line to St. Hy. 199, Control No. R 1605-2-1.

Wheeler and Hemphill Counties—grading, structures, base and surf. 10.968 mi. Hys. FM 48 and 1268, from Hemphill Co. line south to end F.M. Hy. No. 48 and from 5.8 mi. west U.S. 83 to Roberts Co. line and from FM 1268 to Wheeler Co. line, Control No. 489-1-8, FP No. S 731 (3) and C 798-3-3 and C 489-2-1.

Wilson Co.—grading, structures, base and surf. 5.164 mi. Hy. FM 536, from Fairview to Atascosa Co. line, Control 1009-1-5, FP No. S 540 (2).

Okla., Wagoner—B.A. 10/26—City, Wagoner, boat docks and harbor on Lake Gibson. $75,000. Wood & Craig, Philtower Bldg., Tulsa, engrs. CD 12/5/49.

† **South Dakota**—B.A. 10/27—U. S. Eng., 1709 Jackson St., Omaha, Neb., oil circuit breakers for Gavins Point Dam, near Yankton, Inv. 25-066-54-53. Extended date. CD 9/2.

▲ **Oklahoma, Arkansas, Louisiana**—PRODUCTS PIPE LINE—Bids Asked—Sunray Oil Corp., 1st. Natl. Bldg., Tulsa, Okla. (Oklahoma-Mississippi River Products Pipe Line, Inc. being organized to build and operate the project), products pipe line from vicinity of Sunray to (east) on Mississippi River Terminal. $12,000,000. CD 7/8.

BIDS ASKED—BUILDINGS

Okla., Frederick—HOSPITAL—B.A. 10/20—Tillman Co., Frederick, Tillman County Memorial Hospital and equip. $450,000. Plans deposit $50. W. T. Vahlberg, 1517 N. Broadway, Oklahoma City, archt. CD 3/11.

Tex., Beaumont—HIGH SCHOOL—B.A. 10/20—South Park Independent School Dist., Beaumont, 3 unit (Negro) structure for existing high school, incl. gymnasium-auditorium-band rooms. $325,000. Wallace B. Livesay & Son, 920 N. 11 St., archts. Raymond L. Jenkins, 4316 Blossom St., Houston, engr. CD 7/6/51.

Tex., San Antonio—SCHOOL—B.A. 10/20—Northeast Rural High School Dist., C. A. Camp, Lockwood-Selma Rd. elementary school. $325,000. Atlee B. & Robert M. Ayres, Transit Tower, archts. Bids Sept. 16 rejected, LB. $318,166. CD 9/22, under LB.

Tex., San Antonio—SCHOOL—B.A. 10/22—Northeast Rural High School Dist., C. A. Camp., Lockwood-Selma Rd., San Antonio, elementary school. $325,000. Extended date. Atlee B & Robert M. Ayres, Transit Tower, archts. CD 9/28.

Tex., San Angelo—EDUCATIONAL—B.A. 10/27—First Christian Church, San Angelo, 2 story educational, 1 story sanctuary, 1 story social hall and chapel. $325,000. L. Mauldin, Phillips-Talley Bldg., archt. CD 5/13.

Mo., St. Louis—APARTMENT—Bids Asked—Melvin H. Glick & Co., 44 N. Brentwood Blvd., Clayton, 17 story apartment incl. 215 units. Isadore Shank, 2 S. Brentwood St., archt. Otto Heinicke, 122 N. 7 St., struct. engr., adv. ENR 10/8.

SOON LETS CONTRACT—HEAVY CONSTRUCTION

North Dakota—RURAL DISTRIBUTION LINES—Mountrail Electric Co-operative, Stanley, soon lets contract 16.6 mi. rural distr. lines from Belden to New Town. $65,000. Ulteig Eng. Corp., 1114½ Front St., Fargo, engrs. CD 1/3/52.

SOON LETS CONTRACT—BUILDINGS

Tex., Corpus Christi—HIGH SCHOOL—Sisters of Incarnate Word & Blessed Sacrament, 503 Last St., soon lets contract. Wade-Gibson & Martin Med. Prof Bldg., archts. H. P. McElhaney Wilson Tower and T. A. Vernor, 304 Green Ave., Taft, engrs. CD 9/14.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **Kraus-Anderson, Inc.**, 501 S. 8 St., Minneapolis, Minn. LB $156,663. facilities for ILLAS and CRD-6 at Duluth Air Force Base, Inv. 25-066-54-20, DULUTH, MINN. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Sept. 23. CD 9/28.

Orfei & Mariani, 1156 Homer St., St. Paul, Minn. CA $111,783. trunk sewer, EDINA (MINNEAPOLIS P.O.), MINN. Village, E. C. Bank, clk., Edina, Minn. Bids Sept. 14. CD 8/26.

P. Lametti, 615 Drake St., St. Paul, Minn. CA $50,339. water main exten. to serve residential Southdale area, EDINA (MINNEAPOLIS P.O.), MINN. Village, E. C. Bank, clk., Edina, Minn. Bids Sept. 14. CD 9/2.

Pittsburgh-Des Moines Steel Co., 1015 Tuttle St., Des Moines, Ia. CA, $41,200. 750,000 gal. water supply tank, HASTINGS, MINN. City, A. J. Gergen, clk., Hastings, Minn. Bids Sept. 8. CD 8/19.

MISSOURI—State Hy. Comn., **Jefferson City,**
Peter Kiewit & Sons' Co., 1024 Omaha National Bank Bldg., Omaha, Neb. CA **$186,148.** two 120 ft., one 150 ft. continuous plate girder, Sta. 228 plus 03, Greene Co. Bids Aug. 7, awarded Sept. 24. CD 8/12.

MISSOURI—State Hy. Comn., Jefferson City,
Peter Kiewit Sons' Co., 1024 Omaha National Bank Bldg., Omaha, Neb. CA **$540,251.** b. conc. 4.031 mi. Greene Co. Bids Aug. 29, awarded Sept. 24. CD 9/10, under LB

† **U. S. Eng.,** 601 Davidson Bldg., Kansas City 8, Mo. rejected bids Sept. 1, hospital at Sedalia Air Force Base, Inv. 23-028-54-3, SEDALIA, MO. LB **$898,353.** CD 9/16, under LB.

Neale Constr. Co., Inc., 3100 Topeka St., Topeka, Kan. CA **$82,496.** 149 mi. lines and rehabilitation of plant, FLORENCE, KAN. Central Kansas Telephone Co., Florence, Kan. Bids Sept. 2. CD 8/4.

Collins Constr. Co., Leavenworth, Kan. CA **$136,283.** c. conc. paving, LEAVENWORTH, KAN. City, Leavenworth, Kan.

▲ City, City Hall, Wichita, Kan., rejected bids Sept. 15, water treatment plant addns., WICHITA, KAN. Est. **$3,295,000.** Will re-advertise. CD 9/3.

† **Atlantic, Gulf & Pacific Dredging Corp.,** 905 Citizens State Bank Bldg., Houston, Tex., LB **$208,707.** Unit 1 dredging Houston Ship Channel, from Morgan Point to Baytown, Harris Co., Inv. No. CIVENG-41-243-54-13, TEXAS. U. S. Eng., **Box 1229,** Galveston, Tex. Bids Sept. 16. CD **9/21.**

▲ **TEXAS**—State Hy. Comn., **Austin,**
Austin Road Co., P.O. Box 1590, **Dallas 1, Tex., LB $1,230,305,** roadbed tr., c. conc. and **flexible base** shoulders 7.115 mi. Hy. 75, **Proj. 92-2-29, I 832-14,** Dallas Co.;

Cage Bros., 6959 N. San Pedo St., San Antonio, **Tex.** LB **$81,110,** grading, structures, base and surf. 7.612 mi. Hy. FM 671, 1854 and 1977, Proj. S 1927 (1), S 1928 (1) Caldwell and Guadalupe Counties; LB **$294,697,** grading, structures, base, surf. 16.72 mi. FM 640 and 1161, Proj. RI 260-3-1, etc., Wharton Co.;

Cooper & Woodruff, 222 Mays Bldg., Amarillo, Tex., LB **$116,997,** grading, structures, base, surf. 8.142 mi. Hy. FM 1551 and 1559, Proj. **S 1917 (1), S 1556** (1), etc., Hutchinson Co.;

J. R. Fanning, P. O. Box 1278, Lubbock, **Tex., LB** **$82,023,** grading, structures, base, surf. 9.521 mi. Hy. US 60, Proj. 1783 (1), Parmer Co.;

E. W. Hable & Sons, Corsicana, Tex., LB **$163,331,** grading, structures, base and surf. 3.282 mi. from St. 26, 2 mi. southwest Longview, southeast to St. 149, Proj. 1854 (1), Gregg Co.;

Ernest Loyd, P. O. Box 1120, Fort Worth, Tex., LB **$83,131,** structures, base and surf. 9.808 mi. Hy. FM 1859, Proj. R 1787-1-1 and R 779-4-1, Bosque Co.; LB **$84,453,** grading, structures, base and surf. 6.428 mi. Hy. FM 916, Proj. R 1599-2-1, Johnson Co.;

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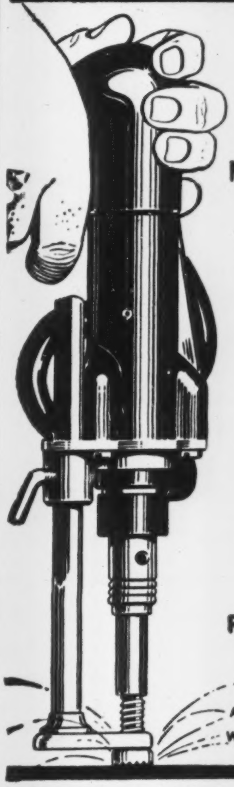

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Hugh McMillan, P.O. Box 1227, El Paso, Tex., LB **$70,290**, grading, structures, roadbed tr. and limestone R.A. pavt. 0.594 mi. Hy. ST 118, Proj. S 368 (2), Brewster Co.;

McMillan-Burkett Constr. Co., P.O. Box 450, Texarkana, Tex., LB **$70,956**, grading, structures, base and surf. 7.304 mi. Hy. FM 1651 and 1504, Proj. S 48 (1), S 1926 (1), Van Zandt Co.;

A. L. Sheppard, 3211 Willbarger St., Vernon, Tex., LB **$61,194**, grading, structures, base and surf. 6.883 mi. Hy. FM 1740, Proj. S 1551 (1), Wichita and Clay Counties;

Henry Stafford & J. R. Fanning, P. O. Box 1047, Lubbock, Tex., LB **$201,746**, flexible base, b. conc. 12.997 mi. SH 17, Proj. S 320 (1), Reeves Co.;

Stone Constr. Co., 712 Continental Life Bldg., Fort Worth, Tex., LB **$151,785**, grading, structures, base and surf. 8.365 mi. FM 1898, Proj. 510-1 and 1-2 and 3, Grayson Co.;

Strain & Brown, Inc., P. O. Box 1057, San Angelo, Tex. LB **$313,862**, flexible base and b. conc. 8.433 mi. Hy. 80, Proj. FI-444 (32), Nolan and Taylor Counties;

Uvalde Constr. Co., P. O. Box 10286, Dallas 2, Tex. LB **$218,863**, hot mix b. conc. pavt. and flexible base shoulders 20.759 mi. Hy. US 77 and 287, Proj. C 48-3-22, etc., Ellis Co.;

H. B. Zachry Co., P. O. Box 2570, San Antonio, Tex., LB **$840,848**, grading, drainage structures, paving 4.4 mi. from Lackland Blvd. to Culebra Rd., Proj. AD-3, 915-28-2, Bexar Co.;

cancelled bids to have been opened Sept. 22, c. conc. 1.148 mi. Hy. U. S. 80, and Loop 260, Proj. C 8-8-33, C 12-1-9, Dallas Co. CD 9/4.

Kaufman County Electric Co-operative, Kaufman, Tex. Purchase and Hire. **$65,000**, some electric line imprv. and extens., Kaufman Co., TEXAS. CD 11/13/50.

Karnes Electric Co-operative, Inc., Karnes City, Tex. Force Account. **$85,000**, 75 mi. new rural distr. lines, Karnes Co., TEXAS. CD 1/16/52.

TEXAS—State Hy. Comn., Austin,

E. W. Hable & Sons, Corsicana, Tex., LB **$280,114.** Big Cypress and Williams Creek Bridges and approaches 2.987 mi. between Carson and Pittsburg, Proj. C 83-8 and 9-10 and 9, Camp and Titus Counties. Bids Sept. 22. CD 9/4.

TEXAS—State Hy. Comn., **Austin,**

Norman L. Larson, 301 Littlefield Bldg., Austin, Tex. LB **$332,868**, 0.301 mi. West Fork Trinity River Bridge and Delaware Creek Bridge on Hy. Loop 12, Proj. F 1089 (10), Dallas Co.;

cancelled bids to have been opened Sept. 23, 0.795 mi. Big Cow Creek Bridge and approaches, Hy. U. S. 190, Proj. S 339 (2), Newton Co. Bids Sept. 23. CD 9/4.

Kellner Jetties Co., 415 E. Gordon St., Topeka, Kan. LB **$74,886**, steel jetty installation at Canadian River Hy. St. 70, Proj. S 1212 (7), Roberts Co., TEXAS State Hy. Comn., Austin, Tex. Bids Sept. 22. CD 9/4.

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▲ TEXAS—State Hy. Comn., Austin,

R. N. Adams, P.O. Box 376, Kaufman, Tex., LB **$92,037**, grading, structures, base, surf. 5.416 mi. Hy. FM 346, Proj. S 809 (2), Smith Co.;

Callan Constr. Co., P.O. Box 3146, Westview Station, Waco, Tex., LB **$149,041**, flexible base and asph. surf. 6.384 mi. from Waco to Erath, Proj. S 1625 (1) McLennan Co.;

Harry Campbell & Harry Newton, Inc., Rte. 5, Box 68-A, Abilene, Tex., LB **$1,008,676**, roadbed tr., flexible base and c. conc. 5.505 mi. Hy. Loop 12, Proj. 581-2-7, Dallas Co.;

Centex Paving Co., 309 First Natl. Bank Bldg., San Antonio, Tex., LB **$120,033**, grading, structures, base and surf. 10.833 mi. Hy. FM 915, Proj. S 1588 (2), Irion Co.;

Collins Constr. Co. of Texas, P.O. Box 1192, Austin, Tex., LB **$389,857**, hot mix b. conc. pave. and flexible base shoulders 20.605 mi. Hy. U.S. 80, Proj. C 95-4 and 5-12 and 2-3, Kaufman Co.;

E. B. Darby & Co., Inc., P.O. Box 467, Pharr, Tex., LB **$241,787**, wid'n., grading, structures, flexible base and asph. 8.533 mi. Hy. SH 107, Proj. S 64 (3), Cameron Co.;

J. M. Dellinger, Inc., P.O. Box 4227, Corpus Christi, Tex., LB **$64,516**, grading, structures, base and surf. 5.406 mi. from Jct. U.S. Hy. 211, south city limits of Alice to 0.4 mi. east and from 0.6 mi. east U.S. 211, 2.3 mi. south, east to FM 1352 and from Jct. FM 1352, 3 mi. southeast of Alice, Jim Wells Co.;

E. W. Hable & Sons, Corsicana, Tex., LB **$100,416**, grading, structures, base and surf. 4.86 mi. Hy. FM 1745, Proj. S 1754 (1), Tyler Co.;

Ned B. Hoffman, 617 Fort Worth Club Bldg., Fort Worth, Tex., LB **$103,514**. flexible base and 2 course surf. tr. 3.862 mi. Hy. U.S. 190, Proj. F 1028 (5), Lampasas Co.;

R. W. McKinney, P.O. Box 190, Nacogodches, Tex., LB **$106,190**, grading, structures, base and surf. 6.192 mi. Hy. FM 1879 and 1753, Proj. F 728-3-1 and R 1709-1-1, Grayson Co.; LB **$90,329**, grading, structures, base and surf. 4.632 mi. Hy. FM 35, Proj. S 1258 (2), Hunt Co.;

Moore Bros. Constr. Co., Lufkin, Tex., LB **$62,246**, grading, structures, base and surf. 4.58 mi. Hy. FM 1274, Proj. C 706-4-2, Nacogdoches Co.;

Dan Pennington, P.O. Box 13, Grapeland, Tex., LB **$67,730**, grading, structures, base and surf. 9.084 mi. Hy. FM 1049 and 1796 and 481, Proj. S 1902 (1), S 1895 (1), etc., Uvalde Co.;

J. W. Perry, 501 Insurance Bldg., San Antonio, Tex., LB **$94,439**, grading, structures, base and surf. 9.795 mi. Hy. FM 1088, Proj. R 1106-2-3, Austin Co.;

H. Ratliff, Rogers, Tex., LB **$71,075**, grading, structures, base and surf. 4.675 mi. Hy. FM 689 and 1273, Proj. C 421-5-3, R 421-5-4, etc., Kerr and Bandera Counties;

Texas Bitulithic Co., P. O. Box 10365, Dallas, Tex., LB **$61,817**, hot mix b. conc. 5.6 mi. Hy. SH 78, Proj. C 9-2-12, Dallas Co. Bids Sept. 23. CD 9/4 and 9/8.

John G. Holland Constr. Co., 1602 Old Spanish Trail, Houston, Tex., LB **$66,175**, some sanitary sewers; LB **$69,279**, storm sewers, ALMEDA, TEX. Mrs. Toy Lee Stickle, Wright Bldg., Oklahoma City, Okla. CD 8/19.

John G. Holland Constr. Co., 1602 Old Spanish Trail Rd., Houston, Tex., LB **$60,115**, site and area earthwork, grading, excavating, leveling, etc. ALMEDA, TEX. Mrs. Toy Lee Stickle, Wright Bldg., Oklahoma City, Okla. CD 8/19.

John G. Holland Constr. Co., 1602 Old Spanish Trail, Houston, Tex., LB **$70,000**. constr. some streets, roads and asph. topping, ALMEDA, TEX. Mrs. Toy Lee Stickle, Wright Bldg., Oklahoma City, Okla. CD 8/19.

John G. Holland Constr. Co., 1602 Old Spanish Trail, Houston, Tex., LB **$47,325**, c.i. water lines, ALMEDA, TEX. Mrs. Toy Lee Stickle, Wright Bldg., Oklahoma City, Okla. CD 8/19.

John G. Holland Constr. Co., 1602 Old Spanish Trail Rd., Houston, Tex., LB **$63,315**, natural gas lines, ALMEDA, TEX. Mrs. Toy Lee Stickle, Wright Bldg., Oklahoma City, Okla. CD 8/19.

Austin Contg. Co., 1000 Singleton Blvd., Dallas, Tex. LB **$118,572**, asph. surf. on 20-acres for South Dallas Equipment Service Center, DALLAS, TEX. City, City Hall, Main and Harwood Sts., Dallas, Tex. Bids Sept. 21. J. C. Rollins, Ch. P. Wks. Engr. CD 5/8/52.

† **Lawless & Alford, Inc.**, Box 600, Austin, Tex., CA **$877,078**, est. $500,000-$1,000,000. 50 bed hospital, Laughlin Air Force Base, Inv. No. ENG-41-243-54-13, DEL RIO, TEX. U. S. Eng., Box 1229, Galveston, Tex. Bids Sept. 10. CD 9/15, under LB.

† **Ole Peterson, Inc.**, 2301 N. Wayside Dr., Houston, Tex. LB **$99,996**, est. $100,000-$500,000. reconstr. Fort Point Boat Yard Hopper Dredge Dock, Inv. No. CIVENG-41-243-54-3, GALVESTON, TEX. U. S. Eng., Box 1229, Galveston, Tex. Bids Sept. 25.

Erwin-Newman Co., Box 1308, Houston, Tex. LB **$364,242**, est. $120,000. Temco Airport imprvs., incl. prefab. steel hangar, GREENVILLE, TEX. City, Greenville, Tex. Bids Sept. 22. CD 9/15.

Layne-Texas Co., 5402 Lawndale St., Houston, Tex. CA **$36,665**, water supply well;

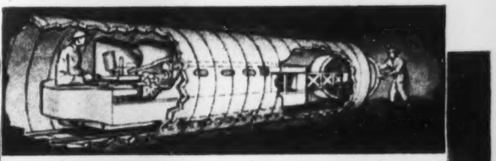
Own Forces. **$59,000**, water sys., near HOUSTON, TEX. Calcot, Ltd., 1601 E. Brundage Lane, Bakersfield, Calif. Miles F. Wortham & Assocs., 5155 Hull St., Houston, Tex., engrs.

Sonnier Constr. Co., 18206 Liberty Rd., Houston, Tex., CA **$78,185**, general area and site work on 40-acre tract, grading, excavating, leveling, etc., 40-acre site, near HOUSTON, TEX. Calcot, Ltd., 1601 E. Brundage Lane, Bakersfield, Calif. Miles F. Wortham & Assocs., 5155 Hull St., Houston, Tex., engrs.

Calcot, Ltd., 1601 E. Brundage Lane, Bakersfield, Calif. Own Forces. **$75,000**, sewers, near HOUSTON, TEX. Miles F. Wortham & Assocs., 5155 Hull St., Houston, Tex., engrs.

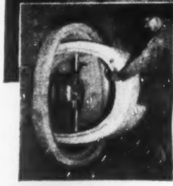
Inner Circles
TUNNELINER PIPE
TRADE MARK

Revolutionizing
UNDERGROUND SEWER CONSTRUCTION

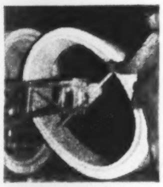


Tunneliner pipe of reinforced concrete is pre-cast in oval shape. Full-ring sections are tilted, carried thru the tunnel—added one-by-one as excavation progresses.

43" equivalent sanitary interceptor sewer of oval *Tunneliner* pipe, Covington, Kentucky, built by S. A. Healy-McHugh Construction Co.; engineered by Vogt, Ivers, Seaman and Associates.



Worker guides section carried forward by Lamar *Tunnelugger*.



Section is easily tilted upright on *Tunnelugger* arm.

Section is turned ready for seating by *Tunnelugger*.

NO EXCAVATION AT SURFACE
NO BLOCKING-OFF OF TRAFFIC

Thoroughly proved in tunneling through wet sand, river muck, rock and clay conditions. Men work inside a full-strength structure in maximum safety.

MATERIALLY REDUCES SEWER COSTS

Very little more earth need be removed than that replaced by the capacity of the pipe. Workers learn *Tunneliner* methods the first few hours on the job. Less equipment is needed, yet sewers are completed in faster time. More than 6 miles of *Tunneliner* pipe have already been placed by contractors who two years ago never heard of it.

All necessary equipment is furnished by Lamar at a nominal rental charge, including: *Tunneluggers*, mud cars, track and pipe hooks. Sizes available now—33" through 72".

For complete information—write, wire or telephone

LAMAR PIPE & TILE CO.

Division of American-Marietta Company
GRAND RAPIDS 9, MICHIGAN

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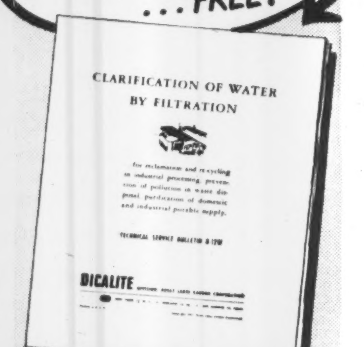
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DICALITE DIVISION | Great Lakes Carbon Corporation
Dept. E, 612 S. Flower St.,
Los Angeles 17, Calif.

Wm A. Smith Constr. Co., 301 Gregg St., Houston, **Tex.** CA **$63,125,** railway spur tracks;

Own Forces, $87,775, loading and unloading docks; **$60,000,** outside general area lighting sys., near HOUSTON, TEX. Calcot, Ltd., 1601 E. Brundage Lane, Bakersfield, Calif. CD 9/24.

City, Lancaster, Tex. Own Forces. **$67,500,** street imprvs., grading, drainage, surf., etc. LANCASTER, TEX.

City, Longview, Tex., Force Account. **$67,000,** Unit No. 3, sanitary sewer collection mains, LONGVIEW, TEX. Homer A. Hunter, 4707 Greenville Ave., Dallas, Tex., engr.

Safeway Stores, Inc., Longview, Tex. Own Forces. **$70,000,** drainage and paved parking area in vicinity of stores, LONGVIEW, TEX.

City, City Hall, San Angelo, Tex. Force Account. **$90,000,** revision of fair grounds, barn, exhibit bldg. some grading, drainage, etc., SAN ANGELO, TEX. CD 9/10.

▲ **Eastern Pipeline Contractors,** Mercantile National Bank Bldg., Dallas, Tex. CA **$3,468,000.** 158 mi. stretch of proposed 540 mi. 10 in.-welded joint pipe line between Billings, Mont. and Spokane, Wash., MONTANA, IDAHO and WASHINGTON. Yellowstone Pipe Line Co., Billings, Mont. (Continental Pipe Line Co. & Associated Companies, Billings, Mont.). CD 9/16.

† **U. S. Eng.,** Box 1538, Albuquerque, N. M. cancelled bids to have been opened about Oct. 7, underground cables concrete foundations for bldgs., bladed road, etc., Kirtland Air Force Base, Inv. No. ENG-29-005-54-16, ALBUQUERQUE, N. M. CD 9/16.

† **Robert E. McKee, General Contractor, Inc.,** Box 1706, Santa Fe, N. M., LB **$105,700,** building and equip. installations, Inv. No. 291-54-2, LOS ALAMOS, N. M. U. S. Atomic Energy Comn., Los Alamos, N. M. Bids Sept. 15. CD 8/19.

BUILDINGS

LOW BIDS AND CONTRACTS

G. J. Grant Constr. Co., Como Ave. and N.P. tracks, St. Paul, Minn. LB **$663,500.** general contract 2 story, bsmnt., 86x200 ft. OFFICE, remodel present bldg., ST. PAUL, MINN. Mutual Service Insurance Co., 1923 University Ave., St. Paul, Minn. Bids Sept. 18. CD 8/19.

J. S. Sweitzer & Son, 739 Pillsbury Ave., St. Paul, Minn. CA **$356,006.** general contract 1 story, part bsmnt., 155x267 ft. cold storage WAREHOUSE, Territorial Rd. and Vandallia St., ST. PAUL, MINN. Central Warehouse Co., 739 Pillsbury Ave., St. Paul, Minn. Bids Sept. 16. CD 9/2.

Capitol City Builders, 617 High St. Owner Builds. **$350,000.** 30 DWELLINGS, DES MOINES, IA.

Milburn Park Co. (Earl A. Thompson & Walter Franey, owners), 5905 Woodson Rd., RFD, Kansas City, Kan. Owner Builds. **$500,000.** 48 DWELLINGS, near KANSAS CITY, KAN.

Woodcock & Fowler, 8716 Goodman St., Lenexa, Kan. Owner Builds. **$400,000.** 34 DWELLINGS, LENEXA, KAN.

W. R. Grimshaw, KOME Bldg., Tulsa, Okla., CA **$700,000.** 12 story OFFICE annex, TULSA, OKLA. National Bank of Tulsa, 4 and Main St., Tulsa, Okla. Black & West, Tri-State Bldg., Tulsa, Okla., archts. Awarded Sept. 17. CD 1/29.

E. P. Roberts, 4827 S. Madison St., Tulsa, Okla., CA, **$250,000.** publishing PLANT and paper WAREHOUSE, TULSA, OKLA. Healing Waters Magazine, 1648 S. Boulder St., Tulsa, Okla. Cecil Stanfield, 2831 Florence St., Tulsa, Okla., archt. Awarded Sept. 17.

▲ **Leslie Crockett Constr. Co.,** P.O. Box 4036, Austin, Tex., LB **$722,650** general constr.;

Boyer & Lagow, Box 4074, Austin, Tex., LB **$364,820,** plumbing, heating and air-conditioning for 3 story, bsmnt., 65,000 sq. ft., rein.-con. frame HOSPITAL, AUSTIN, TEX. St. Davids Hospital, 606 W. 17 St., Austin, Tex. Bids Sept. 24. CD 9/9.

▲ **J. W. Bateson Constr. Co., Inc.,** 420 Gibraltar Life Bldg., Dallas, Tex., LB Base Bid **$1,113,166,** mechanicals and equip. total **$717,046,** est. $2,000,000, new CRIMINAL COURTS and JAIL, 8 story annex, DALLAS, TEX. Dallas Co., c/o Comrs. Court, Court House, Dallas, Tex. Bids Sept. 24. CD 9/3.

Peterson Const. Co., Box 474, Dallas, Tex., LB **$389,988,** est. $352,800, WOMEN'S ACTIVITY BLDG., DALLAS, TEX. State Fair of Texas, Electric Bldg., State Fair Grounds, Dallas, Tex. Bids Sept. 22. CD 8/27.

Ray Bollinger, 309 Empire Bank Bldg., Dallas, Tex. LB **$149,237.** WAREHOUSE, DALLAS, TEX. Apex Supply Co. & Lerer Realty Co., 1117 S. Akard St., Dallas, Tex. Bids Sept. 17. CD 9/10.

Rambo Constr. Co., Box 11245, Fort Worth, Tex. CA **$548,564.** STUDENT CENTER, FORT WORTH, TEX. Texas Christian University, TCU Campus, Fort Worth, Tex. CD 9/25, under LB.

Hamshire-New Holland Independent School Dist., Hamshire, Tex., rejected bids Sept. 15. HIGH SCHOOL and AUDITORIUM, HAMSHIRE, TEX. LB **$457,413.** CD 8/26.

Berry Constr. Co., 5017 Mayfair St., Houston, Tex. CA **$334,116.** 18 DWELLINGS, near HOUSTON, TEX. Paul J. McConnell, developer, 5017 Mayfair St., Houston, Tex. CD 8/10.

Calcot, Ltd., 1601 E. Brundage Lane, Bakersfield, Calif. Own Forces. **$800,000.** COTTON STORAGE PLANT, near HOUSTON, TEX. CD 9/25.

Wm. S. Tanglewood, Constr. Dpt., 1621 Tanglewood St., Houston, Tex. CA **$390,000,** 18 DWELLINGS, HOUSTON, TEX. Wm. G. Farrington, 1621 Tanglewood St., Houston, Tex. CD 8/10.

(Continued on page 327)

Synchronized Power

writes earth-moving success story

One of Roy Kohl's five scrapers hauling a 24-yard load at Lockbourne Air Force Base. On this 212,000-yard job, the scrapers load in 90 seconds and travel to the spreading site at 30 mph.

In 1949, Roy Kohl was a basement excavating contractor in Ohio. During the last four years he has changed his operation and has moved more than 2½ million yards of ore, earth and clay on many types of big jobs.

His success story is built around the operation of 5 tandem-engine Euclid scrapers. The tandem-engine application—one pulling and one pushing—was made possible by Allison TORQMATIC DRIVES which synchronize the power of both engines through a simple control.

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Kohl reports his "Eucs" operate under all conditions, and climb up to 50% grades under full load. The five units now average over 2,000 hours a year. His first scraper moved more than a million yards without any major maintenance on Converter or Transmission.

Your dealer can give you more information about low-cost equipment maintenance where Allison TORQMATIC DRIVES are installed or you may wish to write Allison direct for full particulars.

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Unbeatable Team for Maximum Operating Economy

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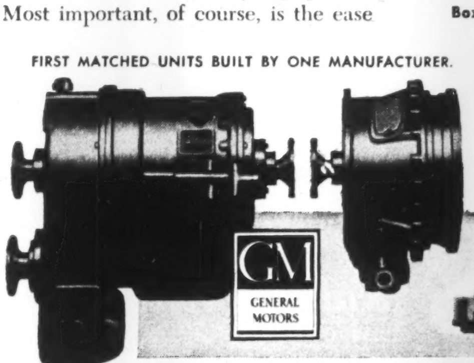
* *Holds* power to load at all times—no clutch pedal to push—no gearshift guess.

* *Cuts* maintenance cost by absorbing shock—eliminates engine lugging—prolongs equipment life.

* *Only* torque converter-transmission team designed to work as a unit and built by one manufacturer.

FIRST MATCHED UNITS BUILT BY ONE MANUFACTURER.



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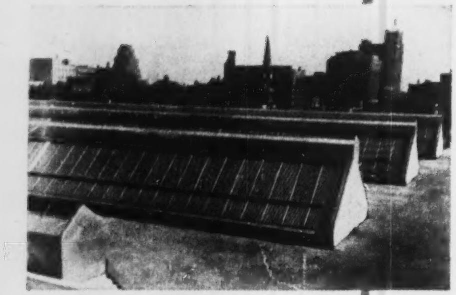

When you specify Original Pennsylvania Corrugated Wire Glass, you build in vital benefits that will see your building through years of function, handsomeness and low-cost maintenance.

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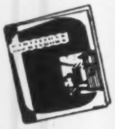
- You build in Low Maintenance . . . a skylight with nothing to corrode, nothing to replace, nothing to re-paint
- You build in Structural Strength . . . heavy, corrugated glass, with wire encased, standing firm under the most punishing machinery vibrations

Original Pennsylvania Corrugated Wire Glass Construction is a complete unit of glass and sheet metal parts. Standard width sheets measure 27¾" Installation is made without supplementary frames—Corrugated Wire Glass is applied directly on wood, steel or concrete.



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1612 MARKET ST. PHILA. 3, PA.
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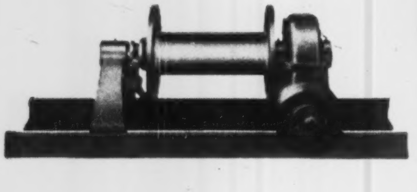
Whether your job is lifting, pulling, loading or hauling, it can be better, easier and more safely handled with a Tulsa Winch. Tulsa Winches for trucks and crawler tractors are equipped with automatic worm brake designed to hold the load suspended. Load can be lowered only by using power. Highest quality materials and precision workmanship assure you of long, trouble-free efficient service. Tulsa Winches are available in capacities from 6500 to 80,000 lbs. For additional information and illustrated literature showing how you can profit with Tulsa Winches, see your nearest Tulsa Winch distributor or write direct to the manufacturer.



This Model 10 Tulsa Winch is used by a commercial chemical fertilizer manufacturer to spot freight cars for loading and unloading. It is powered by an electric motor and does not use lever controls.

Tulsa* Winch
TULSA, OKLAHOMA
DIVISION OF VICKERS Inc.

*Reg. U. S. Pat. Off.

(Continued from page 324)

† **Campbell & Kay**, Box 836, Tyler, Tex., CA **$685,394**. Group 1, Bldgs., PLANT No. 3, Longhorn Ordnance Works, Inv. No. ENG-34-066-54-7. MARSHALL, TEX. U. S. Eng., Box 61, Tulsa 2, Okla. Bids Aug. **27**. CD 9/4, under LB.

FAR WEST

BIDS ASKED—HEAVY CONSTRUCTION

† **Washington**—B.A. 10/15—Bureau Reclamation, Dpt. Interior, Coulee Dam, Wash., feeder canal repair, Station 81 plus 04.5 to Station 01 plus 05 plus, near Grand Coulee Pumping Plant, Grant Co., Spec. DC 4055. L. N. McClellan, Bldg. 1 A, Denver Federal Center, Denver, Colo., ch. engr.

CALIFORNIA—B.A. 10/21—State Div. Hys., P. Wks. Bldg., Sacramento,
Monterey Co.—widening bridge, grading, surf. near Bradley.

CALIFORNIA—B.A. 10/21—State Div. Hys., P. Wks. Bldg., Sacramento,
Fresno Co.—grading, surf. 5.3 mi. Clovis Ave. between State Hy. Rt. 4 and Columbia Ave., $260,000.
Monterey Co.—grading, surf. 0.1 mi. between Seaside Jct. and Prattco.
Shasta Co.—grading, surf. 5.9 mi. between Palo Cedro and Bella Vista, $365,000.

CALIFORNIA—B.A. 10/22—State Div. Hys., 120 S. Spring St., Los Angeles,
San Diego Co.—grading, surf. 1.7 mi. at Sutherland Dam Road.

BIDS ASKED—BUILDINGS

Calif., Richmond—LABORATORY—B.A. 10/15—University of California, Administration Bldg., Berkeley, Zone 4, soil mechanics and bituminous metals laboratory. Plans deposit $25. Jennings & McClure, Berkeley, struc. engrs. John Hudspeth, 1440 Broadway, Oakland, archt.

SOON LETS CONTRACT—BUILDINGS

Wash., Seattle—OFFICE—Sixth & Battery Corp., c/o H. Bittman, archt., Securities Bldg., Zone 1, soon lets contract 2 story, 108x120 ft., rein.-con. office. $300,000.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

WASHINGTON—State Hy. Comn., Olympia,
Hamilton Builders, Olympia, Wash., LB, **$91,096** rein.-con. box girder bridge over Willapa River, Pacific Co. Bids Sept. 22. CD 9/10.

WASHINGTON—State Hy. Comn., Olympia,
Sather & Sons, Yardley, Wash., LB, **$580,956**, b. conc. paving, and rein.-con. girder undercrossing 4.650 mi. Hy. 3, Franklin Co.;
J. W. Hardison, P. O. Box 48, Yakima, Wash., LB, **$178,007**, draining, grading, surf. 19.432 mi. feeder roads north of Potholes Reservoir, Grant Co.;
Fiorito Bros., 1100 Leary Way, Seattle, Wash., LB, **$115,058**, c. conc. b. conc. 0.635 mi. Hy. 1 in Seattle, King Co. Bids Sept. 22. CD 9/19.

† **Civil Aeronautics Admin.**, 5651 W. Manchester Ave., Los Angeles, Calif., Day Labor, glide slope facility for ILS at Seattle-Tacoma Airport, Proposal 4-54-901, SEATTLE, WASH. CD 8/26.

George W. Lind, 5000 N. E. Killingsworth St., Portland, Ore., LB **$531,219**, laterals for West Central Unit, intercepting sewage proj., PORTLAND, ORE. City, City Hall, Portland, Ore., L. G. Apperson, Portland, Ore., city engr. Bids Sept. 22. CD 11/12.

Rotshchild, Raffin & Weirick, 274 Brannan St., San Francisco, Calif. LB, **$198,460**, Moccasin Creek Fish Hatchery Development, Project No. 3 and 4, buildings and residences, MOCCASIN, CALIF. State Div. Architecture, P. Wks. Bldg., Sacramento, Calif.

Monson Bros., 475 6 St., San Francisco, Calif., CA, **$576,697**, Summit Reservoir, Contr. 664, SAN FRANCISCO, CALIF. Public Utilities Comn., City Hall, San Francisco, Calif. Bids Sept. 15, awarded Sept. 22. CD 9/22, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Bechtel Corp.**, 220 Bush St., San Francisco, Calif., CA, Est. **$75,000,000**, general contract for REFINERY, ANACORTES, WASH. Shell Oil Co., 1219 Weslake Ave. N., Seattle, Wash. CD 6/11.

▲ **Bechtel Corp.**, 220 Bush St., San Francisco, Calif., CA, Total **$44,000,000**, steam-electric outdoor GENERATING STATION, EL SEGUNDO, CALIF. Southern California Edison Co., 601 W. 5 St., Los Angeles, Calif. CD 6/12/52, under Calif., Redondo Beach.
Harris Constr. Co., Inc., P. O. Box 109, Fresno, Calif., LB, **$664,268**, general contract SCIENCE bldg. at Fresno State College, FRESNO CALIF. State Div. Architecture, P. Wks. Bldg., Sacramento, Calif. Bids Sept. 22. CD 8/26.

▲ **C. F. Braun & Co.**, 1000 S. Fremont St., Alhambra, Calif., CA, catalytic REFORMING UNIT;
Bechtel Corp, 220 Bush St., San Francisco, Calif., CA, outside facilities, utilities and tankage, OLEUM, CALIF. Union Oil Co. of California, Union Oil Bldg., Los Angeles, Calif. Total est. **$5,570,000**.

F. V. Hampshire, P. O. Box 448, Salinas, Calif., **$327,453**, addnl. INDUSTRIAL bldgs., California State Prison, SOLEDAD, CALIF. State Div. Architecture, P. Wks. Bldg., Sacramento, Calif. Bids Sept. 22. CD 9/2.

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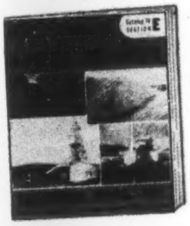

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This machine picks up, transports, and dumps automatically, alone and untended. EFR 225

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CANADA

BIDS ASKED—HEAVY CONSTRUCTION

Alta., Cold Lake—TRANSMITTER BUILDING—B.A. 10/14—Defence Constr. Ltd., 56 Lyon St., Ottawa, Ont., standard unit transmitter bldg., R.C.A.F. Station, $250,000. Plans deposit $100.

N. B., Beaver Harbour—B.A. 10/14—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., breakwater wharf, $150,000. Plans deposit $20. CD 2/11.

Que., Montreal—OFFICE—B.A. 10/15—McColl Frontenac Oil Co. Ltd., Dominion Square Bldg., 8 story, 134x146 ft., rein.-con., structural steel, brick office, Mountain St. Barott & Assocs., Canada Cement Bldg., archts. CD 5/21.

Sask., Saskatoon—AIR TERMINAL BLDG.—B.A. 10/19—Dpt. Transport, Ottawa, Ont., air terminal bldg. at airport. $300,000. Plans deposit $100. CD 6/12.

BIDS ASKED—BUILDINGS

Ont., London—FACTORY—B.A. After 10/1—Strongridge Limited, H. Armstrong, mgr., 124 Weston St., 1 story, 60x95 ft., 2 story, 40x60 ft., brick, steel and cement block factory. $125,000. S. G. Chipman & Co., 233 Queens Ave., archt.

Ont., Pembroke—SCHOOLS—B.A. 10/16 — Pembroke Separate School Bd., Pembroke, Cathedral St. School and Isabella and Munro Streets School, $600,000. Plans deposit $25. J. L. Kingston, 48 Sparks St., Ottawa, archt. CD 2/26.

Ont., Belleville—HIGH SCHOOL—B.A. 10/19—Bay of Quinte District High School Bd., *266 John St., 2 story, steel, brick, concrete high school. $400,000. Plans deposit $50. H. H. Roberts, Wesport, Ont., archt. CD 6/20/52.

SOON LETS CONTRACT—BUILDINGS

Newfoundland, Cornerbrook—CHURCH—Cathedral of Holy Trinity, Cornerbrook, soon lets contract, 60x115x190 ft. church. Maginnis & Walsh, 126 Newbury St., Boston, Mass., U.S.A., archts. CD 2/20/50.

HEAVY CONSTRUCTION

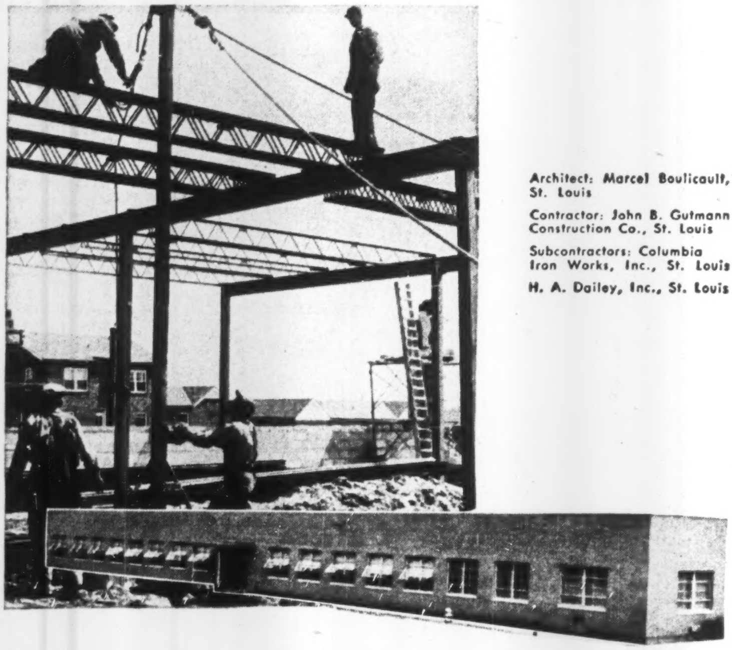
LOW BIDS AND CONTRACTS

Borger Brothers Ltd., 88 Union Bldg., Calgary, Alta., CA, **$62,000**, water services at R.C.A.F. Station, PENHOLD, ALTA. Central Mortgage & Housing Corp., 400 Kensington Bldg., Winnipeg, Man.

Modern Construction Ltd., Salisbury Rd., Moncton, N. B. CA, **$800,000**, rock and gravel fill at Aboideau Dam across Shepody River near Harvey Bank, NEW BRUNSWICK. Maritime Marshlands Reclamation Comn., Amherst, N. S. Bids Aug. 20, awarded Sept. 15. CD 8/4.

▲ **Burns & Dutton Concrete & Construction Ltd.**, 5440 First St. W., Calgary, Alta., and **Mannix Ltd.**, 332 7 Ave. W. Calgary, Alta., CA **$1,538,290** substructure;

Western Bridge Steel Fabricators Ltd., 145 1 St. W., Vancouver, B. C., CA, **$999,878**, superstructure bridge



Architect: Marcel Boulicault, St. Louis

Contractor: John B. Gutmann Construction Co., St. Louis

Subcontractors: Columbia Iron Works, Inc., St. Louis
H. A. Dailey, Inc., St. Louis

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at Nitsilin Bay in Canadian Arctic, NITSILIN BAY, NORTHWEST TERRITORIES, Defence Construction Ltd., Kensington Bldg., Winnipeg, Man. K. F. Hurst, c/o owner, regional engr. Awarded Aug. 31.

Robert D. Mackey Constr. Co., 63 Keefer Bldg., Brockville, Ont., CA, **$60,921**, 6 and 12 in. water mains and 8- to 12-in. sewers, GANANOQUE, ONT. Town, L. F. Bowman, clk., Gananoque, Ont. Lee & Brooks, 83 Clarence St., Kingston, Ont., engrs.

T. D. K. Rooney Constr. Co., 132 Clarence St., Kingston, Ont. CA, **$107,678**, water mains in new Rideau Heights area, KINGSTON, ONT. Kingston Public Utilities Comn., Kingston, Ont. Awarded Sept. 21. CD 7/15.

E. & E. Slegmiller Ltd., 525 Weddell Ave., Kitchener, Ont. CA, **$73,714**, streets, surf. and underground services, KITCHENER, ONT. Municipality, City Hall, Kitchener, Ont. Bids Sept. 9. CD 8/28.

Starr Construction Ltd., 14 MacDonald St., Listowel, Ont., CA, **$90,000**, 110x240 ft., concrete ice arena LISTOWEL, ONT. Ice Arena Bd., Listowel, Ont.

Cie du Constr. et de Pavage de Hull Ltee, 187 Main St., Hull, Que., LB, **$373,550**, sidewalks on various city streets;

Standard Paving Ltd., Front St., Hull, Que., LB, **$522,-357**, asph. paving various city streets, HULL, QUE. City, H. L. Lablanc, Hull, Que., city clk., Hull, Que. CD 4/1/48.

W. D. Laflamme, 51 Richer St., Hull, Que., CA, **$357,-948**. sidewalks various streets;

Standard Paving Ltd., 7 Front St., Hull, Que., CA, **$522,357**, street paving various streets, HULL, QUE. Municipality, Hull, Que. CD 9/28, under LB.

J. O. Carreau, 271 Beauchemin St., Marieville, Que., CA, **$40,000**, 500,000 gal. concrete reservoir, MARIEVILLE, QUE. Municipality, Marieville, Que. Bids Aug. 25. CD 8/20.

Northern Paving Co. Ltd., 10322 St. Lawrence Blvd., Montreal, Que., CA, **$78,102**, sewers in Henri-Bourana Blvd., MONTREAL, QUE. Municipality, City Hall, Montreal, Que. H. A. Gibeau, City Hall, city engr CD 6/8/51.

C. Duranceau Ltd., 2545 Jacques Hertel St., Montreal, Que., CA, **$225,000**, grading, paving Chabanee St., MONTREAL, QUE. Govt. of Canada, Dpt. National Defence, Ottawa, Ont. Defence Constr. 1951 Ltd., 1247 Guy St., Montreal, Que., engr.

F. Lapan Ltd., 7725 Souligny St., Montreal, Que., CA, **$46,800**, 7,500 lin. ft. water piping, Henri Bourana Blvd., MONTREAL NORTH, QUE. Municipality, Montreal North, Que. J. N. Lagnelier, 10 E. Notre Dame St., Montreal, Que., engr.

Montreal Dual Mix Ltd., 3701 Cote St. Michel Rd., Montreal, Que., CA, **$161,829**, paving sidewalks, Assumption and Charland Aves.;

Miron Constr. Ltd., 2201 Cote St. Michel Rd., Montreal, Que., CA, **$65,928**, paving, sidewalks Wiseman Ave., De Sere and Nelligan St., MONTREAL, QUE. Municipality, City Hall, Montreal, Que. H. A. Gibeau, City Hall, Montreal, Que., city engr.

Miron & Brothers Ltd., 2201 Cote St. Michel Rd., Montreal, Que., CA, **$197,000**, paving and sidewalk on Blvd. St. Michel, MONTREAL NORTH, QUE. Municipality, Montreal North, Que. J. N. Langeller, 10 E. Notre Dame St., Montreal, Que., engr.

BUILDINGS

LOW BIDS AND CONTRACTS

Poole Construction Co., Ltd., 10503 - 109 St., Edmonton, Alta., CA **$351,929**, excavation and concrete work up to and including 1st floor slab of $1,200,000 ADMISSION BLDG. for Mental Hospital, OLIVER, ALTA. ALBERTA Dpt. P. Wks., Parliament Bldgs., Edmonton, Alta. Awarded Sept. 15. CD 3/19.

Claydon Co. Ltd., 290 Garry St., Winnipeg, Man., LB **$245,674**, POWER HOUSE at Stony Mountain Penitentiary, STONY MOUNTAIN, MAN. Dpt. Justice, Justice bldg. Ottawa, Ont. Bids Sept. 11. CD 8/6.

Modern Construction Ltd., Salisbury Rd., Moncton, N. B., CA, **$125,000** 3 story, bsmnt., 114x162 ft., rein.-con. WAREHOUSE, St. George and 10 Sts., MONCTON, N. B. Goodyear Tire & Rubber Co. of Canada Ltd., New Toronto, Ont. Luke & Little, 1515 Crescent St., Montreal, Que., archts. Awarded Sept. 21. CD 9/1.

Urquhart Constr. Co., 956 Maitland St., London, Ont., CA, **$125,000** 1 story, 125x130 ft., cement block, steel PLANT addn. LONDON, ONT. Robinson Industrial Crafts, Wellington Rd., London, Ont. Awarded Sept. 23. CD 8/28/52.

Mardlin Constr. Co., 99 R., London, Ont., Own Forces, **$400,000**, 48 one story, bsmnt. DWELLINGS, in Hillcrest subdivision, London Twp. LONDON, ONT.

E. T. Tremblay Constr. Co., Ltd., 39 Gaulburn Ave., Ottawa, Ont., CA, **$661,935**, 83 HOUSES in Overbrook, OTTAWA, ONT. Le Bon Loguis d'Ottawa Ltee, 329 Dalhousie St., Ottawa, Ont. CD 5/11.

Brennan Constr. Co., 400 Gage Ave. N., Hamilton, Ont., CA, **$400,000**, 1 story, brick, steel HIGH SCHOOL, PARKHILL, ONT. North Middlesex High School Bd., Dr. Fred Boyes, chn., Parkhill, Ont. Awarded Sept. 24. CD 4/18/52.

Wingold Constr. Co., Ltd., 2559 Eglinton Ave. W., Toronto, Ont. CA, **$85,000**, 1 story, 66x111 ft., PLANT, Yonge St., RICHMOND HILL, ONT. Ratcliffe Canada Ltd., Tipton, England, H. B. Kohl, 29 Colborne St., Toronto, Ont., archt. CD 9/10.

New Style Building Co., 642 Bathurst St., Toronto, Ont. Owner Builds, **$300,000**. 59-suite APARTMENT, Kingston Rd. north of Edgewood Ave., TORONTO, ONT. E. I. Richmond, 455 Spadina Ave., Toronto, Ont., archt. CD 9/28.

L. E. Elliott, 29 Glamis Ave., Toronto, Ont., CA, **$175,000**, 2 story, concrete WAREHOUSE and OFFICE,

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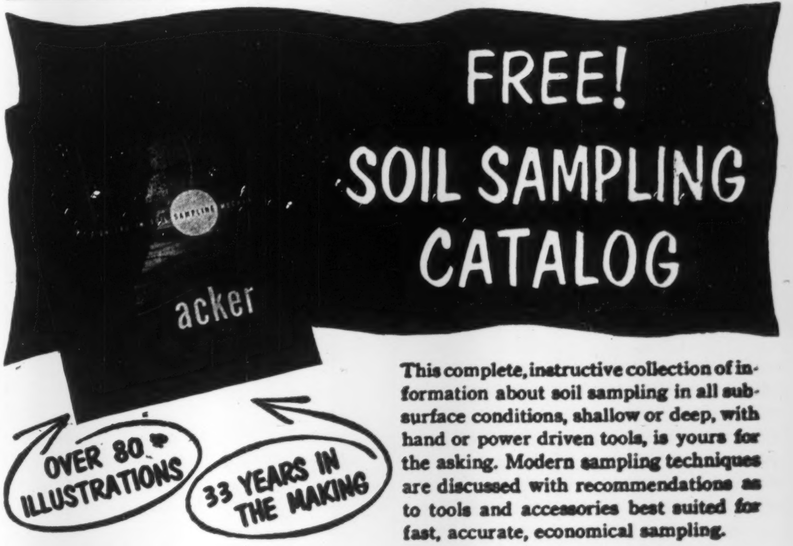

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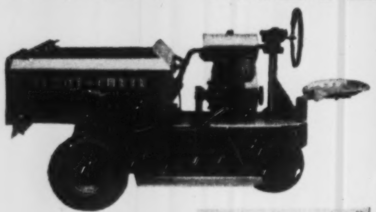

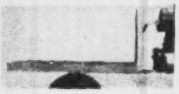

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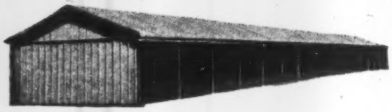

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▲ **Lawrence Construction Co., Ltd.**, 755 Mt. Pleasant Rd. and **A. Holmes & Son**, Anndale Rd., Toronto, Ont., Owner Builds, **$2,500,000**, 13 two story blocks and 13 one story blocks 286-suites APARTMENT, TORONTO, ONT. Dr. E. G. Faludim, 24 Bloor St. E., Toronto, Ont., engr.

Finley W. McLachlan Ltd., 195 Fairbank Ave., Toronto, Ont., CA, **$200,000**, 1 story, 192x208 ft., brick, block FACTORY, Queen St. near Kipling Ave., TORONTO, ONT. Canadian Westinghouse Co. Ltd., 355 King St. W., Toronto, Ont. Awarded Sept. 15.

Petrozzi Constr. Co. Ltd., 4389 Casgrain Dr., Windsor, Ont. CA, **$125,000**, 60x200 ft., concrete WAREHOUSES, McDougall St., WINDSOR, ONT. Western Freight Lines Ltd., 965 Walker St., Windsor ,Ont. J. W. Storey, 21 7 St., Chatham, Ont., archts. CD 7/22.

G. Perrault, Inc., 198 St. Joseph St., Joliette, Que. CA, **$498,000**, SCHOOL, Notre Dame St. MANIWAKI, QUE. School Comn., Maniwaki, Que. Bids Aug. 12.

Concrete Construction Ltd., 1082 Decarie Blvd., Montreal, Que., CA, **$200,000**, 3 story, 37x87 ft., concrete, brick, stone BAKERY addn., MONTREAL, QUE. Harrison Brothers Ltd., 7 Glen Rd., Montreal, Que. Brais & Savard, 7084 St. Denis St., Montreal, Que., archts.

Key Construction Ltd., 1040 Bleury St., Montreal, Que., CA, **$499,511**, municipal GARAGE de Fleurimont St., MONTREAL, QUE. Municipality, City Hall, Montreal, Que. Bids Sept. 22. CD 8/14.

Guay & Brothers Ltd., 6900 Cote de Neiges Rd., Montreal, Que., CA, **$175,000**, 1½ story, bsmnt., 75x115 ft., concrete, brick, WAREHOUSE, MONTREAL, QUE. National Butcher Supply Co., 4367 Papineau St., Montreal, Que. Beaulieu & LeBal, 4151 W. Sherbrooke St., Montreal, Que., engrs. Dufresne & Boula, 85 Hodge Ave., St. Laurent, Que., archts.

Proposed Projects

WATER SUPPLY

Mo., Kansas City—Water Dist. No. 2, c/o Logan Jones, secy., 69 and Blue Ridge exten., Kansas City, Mo., voted **$175,000** bonds, imprv. Public Water Dist. No. 2, near Raytown.

N. Y., Floral Park—Jamaica Water Supply Co., 161-20 89 Ave., Jamaica, well, pumping station and 1 m. g. underground storage tank on Cisney Ave., east of Gilbert Court. **$300,000.**

O., North Hampton—Village, WW sys. **$112,000.**

Okla., Midwest City—City, defeated bonds Sept. 22, WW extens. **$131,000.** J. M. Plank, 1323 N. Robinson St., consult. engr. CD 9/2.

Wash., Bremerton—City, City Hall, 2 circular covered basins and valve house for 2,600,000 gal. reservoir in Forest Ridge Park. **$194,991.** J. W. Cunningham & Assocs., Spalding Bldg., Portland, Ore., consult. engrs.

▲ **Alaska, Anchorage**—City, City Hall, voted bonds Sept. 11, rebuild downtown water lines, **$500,000;** water filtration plant, **$525,000;** extend city water service to Spenard, **$300,000.** CD 9/1.

SEWERS, WASTE DISPOSAL

Calif., Fillmore—City, 345 Central Ave., defeated **$600,000** bonds, sewage treatment plant. Hostrup, Lyons & Assoc., 9526 W. Pico Blvd., Los Angeles, consult. engrs. CD 8/3.

Colo., Canon City—Town, City Hall, sewage treatment, **$400,000.** Wilson & Co., 20 E. 9 Ave., Denver, consult. engrs. CD 4/8/46.

Mich., Ironwood—City, Lloyd C. Waterstrout, mgr., sewage disposal, sewage plant and treatment facilities, **$200,000.** Hitchcock & Estabrook, Inc., Lincoln Bldg., Minneapolis, Minn., consult. engr.

▲ **Mich., Jackson**—City, City Hall, defeated **$2,750,000** bonds Sept. 15, storm sewerage sys., CD 7/21.

Okla., Midwest City—City, defeated bonds Sept. 15, storm sewers, **$61,500;** sewage disposal plant, **$785,000.** J. M. Plank, 1323 N. Robinson St., Oklahoma City, consult. engr. CD 8/18.

R. I., East Providence—Town, Bd. Sewer Comr., Town Hall, trunk sewer lines, ejector station, etc. **$100,000.** Charles A. Maquire & Assoc., 142 Richmond St., Providence, consult. engrs.

Tex., Arlington—Arlington Development Co., c/o Robert B. Holland, Jr., Gulf States Bldg., Dallas, sanitary sewers, **$68,500;** storm sewers, **$62,500.**

Tex., Houston—Arnold Building & Development Co., c/o A. V. Arnold, 2517 Wordsworth St., storm sewers, **$65,000;** sanitary sewers, **$65,000,** in area of Graceland Terrace Addn.

Tex., Houston—J. E. Lyon Development Co., 2023 S. Shepherd St., Sanitary sewers, **$65,000;** storm sewers **$60,000** in area of Parrett Subdivision.

Tex., Houston—Robert Newkirk, 11527 Memorial Dr., sanitary sewers, **$63,000;** pipe and open storm sewers and drainage, **$60,000** in an exten. of Million Valley Forge Addn.

Tex., Irving—John J. Stuart, 3628 Southwestern St., Dallas, and c/o Lynne Park, Irving, sanitary sewers, **$62,600;** storm sewers, **$60,000.**

Tex., San Antonio—E. J. Burke & Sons, 1100 Goliad Rd., sanitary sewers, **$63,500**; storm sewers, **$60,000**, in S. E. Highland Park area extens.

▲ **Utah, Salt Lake City**—City, City Hall, voted **$6,480,000** bonds, sewers. CD 5/24/44.

Wash., Edmonds—City, City Hall, sewage treatment plant. **$100,000**.

Alaska, Anchorage—City, City Hall, voted bonds Sept. 11, sewer installations. **$150,000**. CD 8/7.

Ont., St. Catherines—Grantham Twp., Harold Cove, clk., 145 King St., sewage disposal plant for Grantham Twp. housing developments, **$360,000**. Dineen, Philip & Roberts, 63 John St. S., Hamilton, consult. engrs.

BRIDGES

Okla., Oklahoma City—City, City Hall, Bridge Contr. No. 4, reconstr. Exchange Ave. Viaduct, **$625,000**, Hudgins, Thompson-Ball & Assoc., 1100½ W. Main St., consult. engrs. CD 7/31, under LB.

STREETS AND ROADS

ALABAMA—State Hy. Dpt., Montgomery,
Russell Co.—4-lane highway on U.S. 80 from city limits of Phenix City to Broad St. in same city, **$750,000**.

Ont., Hamilton—City, J. F. Berry, clk., asph. on concrete paving, Stuart, Barton, and Queen Sts. W. L. McFaul, c/o owner, engr. CD 2/21/51.

EARTHWORK, WATERWAYS

▲ **N. Y., Hempstead**—Town Bd., Hempstead, jetties to protect beach from Atlantic Beach to Far Rockaway, **$2,000,000**. CD 6/6/49.

Tex., Bay City—Town, Bay City, No. 8 Drainage Proj. **$150,000**.

AIRPORTS

Tex., Grand Prairie—PAINT HANGAR and STRIPPING BLDG.—Chance Vought Aircraft, Grand Prairie, plans by Smith & Warder, Box 1088, Grand Prairie, paint hangar and stripping bldg. **$150,000**.

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Mexico, Chetmul—Nacional Financiera, V. Carranza, 25, Mexico City, plans triplay factory. **$875,000**.

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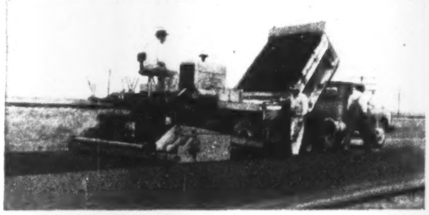

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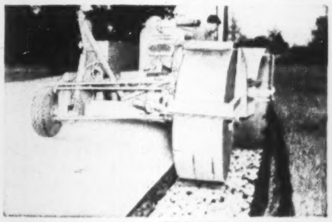

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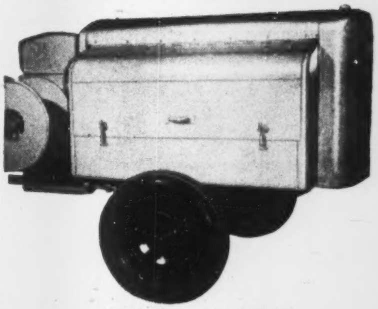

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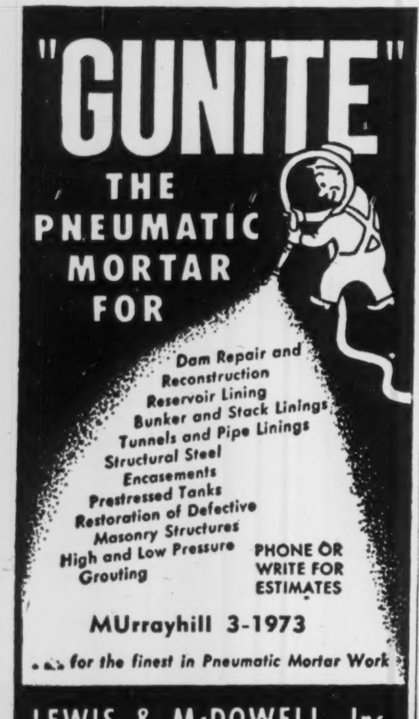

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▲ **Korea**—American-Korean Co-Ordination Groups, The United Nations Korean Reconstruction Agency, the Korean Civil Assistance Command (a subsidiary unit of the U. S. Army), Office of Planning, Korean Prime Ministry's office, the Southern Korean Electric Co. and the Korean Power Co. plans $100,000,000 in construction for Southern Korean Reconstruction program. Plans include:

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bridge and highway construction (may be handled by U. S. Engineers).

irrigation, by Korean forces, **$2,000,000.**

PUBLIC BUILDINGS

▲ **Calif., Bakersfield**—SCHOOLS—Bakersfield City School District, 1600 "K" St., plans by Wright, Metcalf & Parsons, 2323 "E" St., 38,275 sq. ft. frame, stucco Fremont School, **$500,000;** 36,659 sq. ft. frame, stucco Feliz School, **$668,933.** CD 2/6.

Calif., Baldwin Park—SCHOOL—Baldwin Park School District, 3699 N. Holly Ave., plans by Kistner, Wright & Wright, 816 W. 5 St., Los Angeles, 1 story, frame, stucco 23,000 sq. ft. Heath School addn. **$300,000.**

Calif., Los Angeles—SCHOOL—Los Angeles Bd. Educ., 1425 S. San Pedro St., plans by Martin Snell, 8321 Cedros St., Van Nuys, Burbank Blvd. School, Van Nuys, **$360,000.** CD 6/13/52.

Calif., Salinas—SCHOOLS—City, City Hall, **$920,000** bond election Nov. 13, schools.

Calif., Sunnyvale—SCHOOL—Sunnyvale Elementary School District, Sunnyvale, plans by Donald Power Smith, 583 Market St., San Francisco, Fair Oaks Ave. Elementary School. **$300,000.**

† **Calif., Two Rock Ranch Station**—RECREATION, THEATRE, etc.—U. S. Eng., 180 New Montgomery St., San Francisco, plans by John W. Gloe, 362 Clay St., San Francisco, recreation bldg. and theatre, etc. **$750,000.**

▲ **Colo., Aurora**—SCHOOL—School District No. 28-J, 1225 Kenton St., voted bonds, high school between 10 and 11 Aves. and Newark and Peoria Sts. **$1,500,000.** Atchison & Kloverstrom, 1254 Monaco Parkway, Denver, consult. engrs. and archts. CD 8/4.

▲ **Colo., Denver**—COUNTY JAIL—City and Denver Co., City and County Bldg., plans by G. Meredith Musick, engr. and archt., 1000 Patterson Bldg., county jail, **$2,500,000.** Parr & Anderhold, 109 N. Robinson St., Oklahoma City, Okla., consult. engrs. CD 9/17.

▲ **Colo., Lakewood**—SCHOOLS—Jefferson County School District No. R-1, 1580 Yarrow St., grade school, Wheat Ridge, **$518,520;** grade school, Lakewood, **$668,520.** John K. Monroe, 400 Security Life Bldg., Denver, consult. engr. and archt.

Conn., Beacon Falls—SCHOOL—Town, Bd. Educ., plans by Walter Crabtree, Jr., 195 Fern St., West Hartford elementary school, Highland Ave. **$450,000.** CD 5/26/52.

▲ **Fla., Chattahoochee**—INFIRMARY—Florida State Improvt. Comn., Caldwell Bldg., Tallahassee, plans by Griffin & Gomon, Daytona Beach, two infirmary buildings at State Hospital, **$2,215,000.** CD 10/2/52.

Fla., Chipley—HIGH SCHOOL—Washington Co. Bd. P. Instruction, Chipley, plans by Norman P. Gross, Panama City, high school. **$350,000.**

▲ **Fla., Fort Lauderdale**—MENTAL HOSPITAL—Florida State Improvt. Comn., Caldwell Bldg., Tallahassee, plans by Gamble, Pownall & Gilroy, 1407 E. Las Olas Blvd., South Florida Mental Hospital, **$10,000,000.**

Fla., Tarpon Springs—PLANT—City, City Hall, plant. **$100,000.**

Idaho, Burley—HIGH SCHOOL—School Bd., Burley, voted bonds, high school. **$540,000.**

Idaho, Eden—SCHOOL—School District 262, Eden, plans by S. W. Winburn, Beason Bldg., Salt Lake City, Utah, Junior-Senior High School. **$345,000.**

▲ **Idaho, Kellogg**—SCHOOL—School Bd., District 391, Kellogg, plans by Culler & Gale, Realty Bldg., Spokane, Wash., high school, **$1,000,000.** CD 9/1.

Ill., Chicago—SCHOOL—Bd. Educ., 228 N. La Salle St., Zone 1, Taft High School, 5625 N. Natoma Ave. **$700,000.**

Ill., Chicago—CENTRAL TRAFFIC OFFICE—City, City Hall, plans by Paul Gerhardt, city archt., City Hall, central traffic office, conversion from 7 story, bsmnt grocery warehouse. **$600,000.**

Kan., Beloit—SCHOOL—School Bd., Beloit, school, **$450,000.**

Kan., Leavenworth—HOSPITAL—Leavenworth Co., Leavenworth, hospital, **$500,000.**

La., Baton Rouge—CAPITOL—State, State Capitol, plans by August Perez & Assoc., Audubon Bldg., New Orleans, capitol annex to house Welfare Dpt. **$750,000.**

▲ **Md., Baltimore**—HEALTH—City, Bureau Bldg. Constr., 410 Municipal Bldg., Zone 2, Western District Health

Bldg. **$1,000,000.** **R. E. L. Williams, c/o owner,** bldg. constr. engr.

Md., Baltimore—HOME—City, Bureau Bldg. Constr., 410 Municipal Bldg., Zone 2, White Children's Home alterations. **$800,000.** R. E. L. Williams, c/o owner, bldg. constr. engr.

Md., Baltimore—MARKET—City, Bureau Bldg. Constr., 410 Municipal Bldg., Zone 2, plans by A. C. Rodziszewski, 20 E. Lexington St., 1 story, 40,000 sq. ft. Lafayette Market, Laurens St. and Penna. Ave. **$350,000.** R. E. L. Williams, c/o owner, bldg. constr. engr.

Md., Towson—SCHOOL—Baltimore Co. Bd. Educ., Aigburth Rd., plans by Fisher, Williams, Nes & Campbell, 1020 St. Paul St., 1 and 2 story, brick, block, rein.-con. Dundalk High School addn., Dundalk, **$500,000.** Van Rensselaer Saxe, 1701 St. Paul St., Baltimore, struct. engr. Egli & Gompf, Inc., 1019 N. Calvert St., Baltimore, mech. engr. Morris R. Baker, c/o owner, constr. engr.

▲ **Mass., Boston**—LIBRARY—City, Trustees Public Library, Copley Square, plans by Alfred Morton Githens, 101 Park Ave., New York, N. Y., 4 story, bsmnt., limestone library addn., Boylston St. **$4,000,000.**

Mass., Edgartown—SCHOOL—Town, Chester V. Sweatt, supt. Schools, William St., plans by Architects Collaborative, 96 Mt. Auburn St., Cambridge, elementary school. **$300,000.**

▲ **Mass., Framingham**—SCHOOL—Town, School Bldg. Comn., Supt. Schools, Union Ave., plans by Kilham, Hopkins, Greeley & Brodie, 9 Arlington St., Boston, Senior High School, Walnut St. **$2,720,000.**

▲ **Mass., West Springfield**—SCHOOL—Town, School Dpt., plans by Warren H. Ashley, 967 Farmington Ave. W., Hartford, Conn., and Paul B. Johnson, assoc. archt., 66 Vernon St., Springfield, high school, Piper Rd., **$2,000,000.** Marchant & Minges, 967 Farmington Ave. W., Hartford, Conn., consult. engrs. Charles A. Currier, 967 Farmington Ave. West Hartford, site planner. CD 9/6/51.

▲ **Mich., Flint**—CIVIC CENTER—City, City Hall, **$6,000,000** bond election Nov. 3, civic center, incl. city hall, police and fire headquarters, health bldg. CD 4/14.

Mo., Webb City—SCHOOL—Bd. Educ., Webb City, plans by Bissman & Matthews, 330 E. Walnut St., Springfield, elementary school. **$300,000.**

▲ **Mo., Columbia**—POWER PLANT—City, City Hall, power plant imprvs., 10,000 kw. addn., **$1,159,279;** 15,000 kw. addn., **$2,992,000;** 15,000 kw. new plant, **$3,463,900.** Lutz & May, Finance Bldg., Kansas City, Mo., consult. engrs. CD 3/22/48.

▲ **Neb., Grand Island**—POWER PLANT—City, City Hall, power plant addns. **$2,000,000-$3,000,000.** Lutz & May, Finance Bldg., Kansas City, Mo., consult, engrs.

▲ **N. H., Portsmouth**—HIGH SCHOOL—City, City Mgr's. Office, City Hall, plans by Marcus T. Reynolds, 143 Washington Ave., Albany, N. Y., high school. **$1,000,000.** CD 6/20/45.

N. Y., East Meadow—JUVENILE DETENTION—Bd. Supervs. Nassau Co., Old Country Rd., Mineola, plans by Paul F. Jagow & Richard Heidelberg, 250 Fulton Ave., Hempstead, Juvenile Detention Bldg., Old Country Rd. and Wantagh Causeway. **$500,000.**

▲ **N. Y., Glen Cove**—HOUSING—Glen Cove Housing Auth., Bridge St., slum clearance housing for 125 families, 6-acre tract bounded by Shore Rd., Glen Cove, Burns and Hillside Aves. **$1,800,000.**

▲ **N. Y., Seaford**—SCHOOL—Seaford School Bd., Seaford, 36-classroom elementary school, Washington and Sunset Aves. **$1,450,000.**

▲ **O., Ashland City**—SCHOOLS—School Dist., High School Bldg., bond election Nov. 3, for schools, **$1,280,000.**

O., Athens—CHILDREN'S HOME—Athens Co., Court House, **$300,000** bond election Nov. 3, addns. and imprvs. at Athens County Children's Home. 10/8/53.

▲ **O., Canton**—SCHOOLS—Stark Co. Local School Dist., 933 Market Ave. N., **$1,750,000** bond election Nov. 3, for schools. CD 8/25/44.

O., Mayfield City—SCHOOLS— School Dist., Center Rd., bond election Nov. 3, for schools. **$795,000.**

O., Parma—CITY HALL—City, City Hall, 6611 Ridge Rd., bond election Nov. 3, city hall. **$600,000.** CD 9/16.

▲ **O., Piqua City**—SCHOOLS—School Dist., Piqua City, **$1,850,000** bond election Nov. 3, for schools. CD 5/26/49.

▲ **O., Shaker Heights**—SCHOOLS—School Dist., S. Woodland and Woodbury St., **$4,100,000** bond election Nov. 3, for schools. CD 11/21/51.

▲ **O., South Euclid**—SCHOOLS—South Euclid-Lyndhurst Bd. Educ., Mayfield and Evanston Rds., bond election Nov. 3, two elementary schools and other school imprvs. **$1,780,000.**

O., Urbana City—SCHOOLS—School Dist., bond election Nov. 3, for schools. **$995,000.**

Okla., Midwest City—HOSPITAL—City, defeated bonds Sept. 15, hospital. **$300,000.** J. M. Plank, 1323 N. Robinson St., Oklahoma City, consult. engr. CD 8/18.

Ore., Vale—SCHOOL—Vale School District, Vale, plans by H. Brandt Gessel, Seil Bldg., Walla Walla, Wash., 1 story, brick veneer over block high school. **$400,000.**

Tex., Bay City—COURT HOUSE—Matagorda Co., Bay City, plans by H. Voelcker & Assocs., 1202 Dennis St., Houston, court house. **$350,000.**

Tex., Corsicana—DORMITORY—Bd. for Texas State Hospitals & Special Schools, 45 and Lamar Sts., Austin, plans by Walter C. Moore, c/o owner, replacing boys dormitory and misc. imprvs. at Texas Deaf, Blind and Orphan School. **$300,000.** CD 10/16/46.

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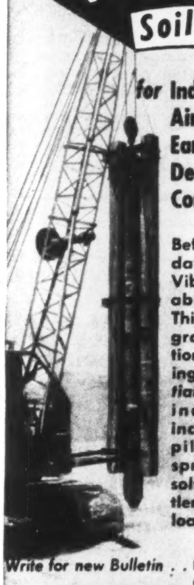

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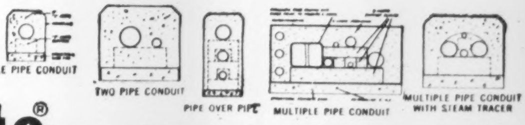

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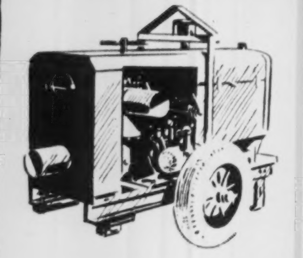

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▲ **Tex., Galena Park**—SCHOOLS—Galena Park Independent School Dist., Galena Park, **plans by** Herbert Voelcker & Assoc., 1202 Dennis St., Houston, school admin. and auditorium, **$375,000; 20-room addn.** to elementary school in Galena Park, **$725,000;** new elementary school in Woodlawn Acres, **$550,000.** CD 3/27.

Tex., Jacksonville—SCHOOLS—Jacksonville Independent School Dist., Jacksonville, high school for Whites, **$400,000;** converting existing high school into a Junior high school for Whites, **$300,000.** CD 4/3/51.

Tex., Judson—HIGH SCHOOL—Judson Independent School Dist., c/o A. M. Anderson, supt., Rte. 5, Judson, plans by Preston M. Geren, 1607 Fort Worth Natl. Bank Bldg., Fort Worth, high school and auditorium. **$300,000.** CD 8/21.

▲ **Tex., Kerrville**—WARD BLDG. GROUP, etc.—Bd. for Texas State Hospitals & Special Schools, 45 and Lamar St., Austin, plans by Walter C. Moore, superv. archt., c/o owner, ward bldg. group for 400 patients. **$1,000,000;** administration-assembly hall-special services, **$300,000.**

Tex., Mexia—ADMINISTRATION—Bd. for Texas State Hospitals & Special Schools, 45 and Lamar Sts., Austin, plans by Walter C. Moore, c/o owner, administration, **$300,000.** CD 12/9/48.

Tex., Winters—SCHOOL—Winters Independent School Dist., Winters, plans by David S. Castle, 1082½ First St., Abilene, elementary school. **$325,000.**

▲ **Utah, Midvale**—HIGH SCHOOL—Jordan School Dist., 9361 S. State St., Sandy, plans by Ashton, Evans & Brazier, 24 South West Temple St., Salt Lake City, high school. **$1,500,000.**

▲ **Va., Fredericksburg**—SCIENCE BLDG.—Mary Washington College, Fredericksburg, science bldg. **$1,708,000.**

Va., Heathsville—HIGH SCHOOL—Northumberland County School Bd., Heathsville, plans by Samuel N. Mayo, 1900 W. Broad St., Richmond, 1 story high school, Horse Head. **$300,000.** CD 4/30/52.

Va., Richmond—MUSEUM, etc.—Virginia Historical Society, 707 E. Franklin St., plans by Carneal & Johnston, Atlantic Life Bldg., 3 story museum and library. **$350,000.**

▲ **Va., Williamsburg**—DORMITORY, etc.—College of William & Mary, Williamsburg, women's dormitory, **$787,000;** student center bldg., **$1,195,000.**

Wash., Walla Walla—PLATE MILL—State Dpt. P. Institutions, Olympia, plans by J. W. Maloney, Central Bldg., Seattle, Zone 4, plate mill at State Prison. **$300,000.** CD 6/24/45.

Wis., Rhinelander—SCHOOL—Bd. Educ., Rhinelander, plans by Foeller, Schober, Berners, Safford & Jahn, 310 Pine St., Green Bay, 2 story Junior HIGH SCHOOL. **$887,500.**

Wyo., Casper—JUNIOR COLLEGE—Natrona County High School District, Casper, bond election Oct. 20, Junior College, **$600,000.** Goodrich & Wilking, 226 E. Second St., consult. engrs. **Robert Wehrli,** 406 Wyoming National Bank Bldg., **archt. CD 9/21.**

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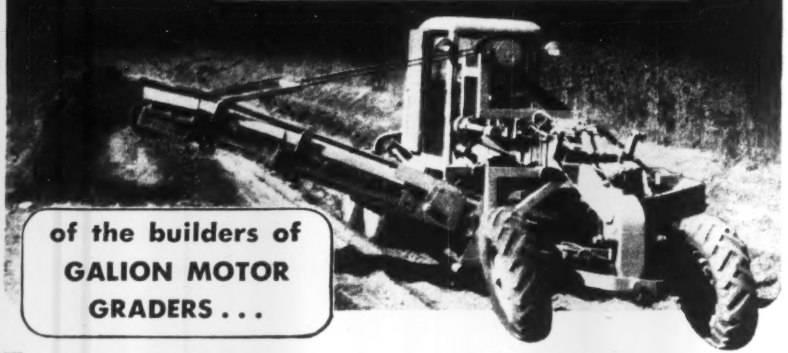

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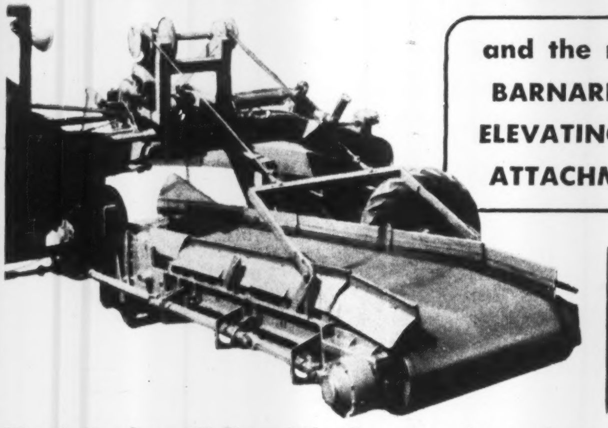

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Alaska, Anchorage—CITY HALL—City, City Hall, defeated bonds Sept. 11, city hall. **$800,000.** CD 9/2.

▲ **B. C., New Westminister**—NURSES HOME—Royal Columbia Hospital Bd., R. W. Ballantyne, chn., plans by E. Evans & Son, 1119 W. Pender St., Vancouver, 200-bed nurses' home, sitting rooms, classrooms, auditorium, recreation rooms, etc. **$1,000,000.**

▲ **Ont., Belleville**—HOSPITAL EXTENSION—Belleville General Hospital, Dundas St. East, plans by Govan, Ferguson, Lindsay, Kaminker, Maw, Langley & Keenleyside, 515 Jarvis St., Toronto, hospital exten. **$1,250,000.** CD 1/10/45.

▲ **Ont., London**—BARRACKS—Dpt. National Defence, Ottawa, addnl. buildings at Wolesely Barracks, incl. new quarters, **$5,000,000.**

COMMERCIAL BUILDINGS

Ala., Tuscaloosa—HOTEL—Tuscaloosa Hotel Co., Inc., P. O. Box 400, plans by I. N. MacCammon, 209 Browder St., Dallas, **Tex.**, hotel, **$950,000.** CD 2/25.

Calif., Los Angeles—OFFICE—Herbert Kronish & Sanford Shear, c/o George U. Novikoff, engr., 8625 Crenshaw Blvd., 25,200 sq. ft. office.

Fla., Jacksonville—DEPARTMENT STORE—L. L. Meitus, c/o J. Brooks Haas, 620 Jackson St., department store **$400,000.**

Ind., Hammond—TEMPLE—Temple Beth-El Congregation, 6427 Forest Ave., plans by Bachman & Bertram, 5116 Hohman St., temple, **$300,000.**

Kan., Kansas City—STORE—Helzberg's Diamond Shops, 1013 McGee St., Kansas City, Mo., plans by W. I. Fisher, 301 S. Main St., Wichita, store, **$400,000.**

Kan., Lawrence—SORORITY HOUSE—Tau Chapter of Alpha Delta Pi Sorority of University of Lawrence, Lawrence, plans by V. F. Smith, Lawrence, sorority house. **$325,000.**

Mass., Cambridge — SCHOOL — Immaculate Conception R. C. Parish, 432 Windsor St., plans by Whelan & Westman, 7 Water St., Boston, parochial school addn. **$300,000.**

Mich., Lincoln Park—CHURCH—Lincoln Park Presbyterian Parish, Lincoln Park, plans by O'Dell, Hewlett & Luckenbach, 950 N. Hunter Blvd., Birmingham, 1 story, bsmnt., brick, stone church, **$300,000.**

▲ **Mich., Pontiac**—SHOPPING CENTER HOUSING—Dunham Lake Development Co., Pontiac, shopping center-housing, 1,000 acre, development, incl. homes, shopping center, church, theater and school, Highland Section, near Lake Dunham, **$10,000,000.** Murray D. Van Wagoner, 2680 Penobscot Bldg., Detroit, engr.

Minn., Minneapolis — SCHOOL — Mt. Olivet Lutheran Church, Rev. R. K. Youngdahl, W. 50 St. and Knox Ave. S., plans by Magney, Tusler & Setter, 202 Foshay Tower, 2 story school unit, W. 50 St. and James Ave. S. **$400,000.**

▲ **Miss., Jackson**—MEDICAL ARTS—Mississippi Baptist Hospital, D. C. Simmons, chn. Bd. Trustees, 1190 N. State St., plans by Spain & Biggers, Deposit Guaranty Bank Bldg., 4 to 6 story medical arts bldg. providing office space, 10,000 sq. ft. each floor. **$2,000,000.** CD 7/25/51.

Mo., Kansas City—SCHOOL—Guardian Angel Parish, 1310 Westport Rd., plans by Shaughnessy & Bower, 3527 Broadway, Kansas City, Mo., school. **$325,000.**

Neb., Omaha—HOSPITAL—Children's Memorial Hospital, 44 and Dewey Ave., hospital addn. **$450,000.**

N. J., Trenton—HOSPITAL—Mercer Hospital, 446 Bellvue Ave., plans by Skidmore, Owings & Merrill, 575 Madison Ave., New York, N. Y., hospital addns., alterations, **$500,000.**

N. Y., White Plains—SYNAGOGUE—Jewish Community Center, 252 Soundview Ave., plans by Fritz Nathan, 200 Central Park South, New York, Zone 19, synagogue addn., Soundview Ave. **$350,000.**

N. C., Asheville—HOSPITAL—Highland Hospital, Zillicoa St., plans by Six Associates, 1095 Hendersonville Rd., hospital addn. **$400,000.**

O., Cincinnati—STORE—Louis H. Wiethe, 7616 Reading Rd., expansion of store facilities for Valley Shop-In, Reading Rd. **$500,000.**

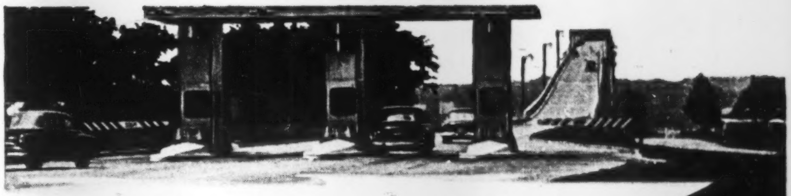
O., Columbus—ENGINEERING—Central Ohio Technical Foundation, c/o Charles F. Lucks, pres., at Battelle Memorial Institute, 505 King Ave., engineering bldg. for use of 23 Central Ohio technical societies. **$350,000.**

O., Columbus—REHABILITATION CENTER—Children's Hospital, 561 S. 17 St., 2 story, 120 sq. ft. rehabilitation center to house offices, storage. **$350,000.**

Tenn., Memphis—OFFICE—Max Milstead, 2064 Union St., plans by Northern & Windrom, 236 Court Ave., office. **$300,000.**

▲ **Tex., Arlington**—APARTMENT UNITS—Arlington Development Co., c/o Robert B. Holland, Jr., Gulf States Bldg., Dallas, Phase 1, 25 masonry frame apartment units, concrete slab fdn. **$300,000;** Phase 2, 35 apartment units, **$335,000;** Phase 3, 32 masonry, frame apartment units, concrete slab fdn., **$308,100;** Phase 4, 28 masonry, frame apartment units, concrete slab fdn., **$315,125;** Phase 5, 37 masonry, frame apartment units, concrete slab fdn., **$352,500;** Phase 6, 41 apartment units, **$391,000;** Phase 7, 35 apartment units, **$338,245;** Phase 8, 45 apartment units, **$415,000,** all foregoing in an area of 175-acre tract near General Motors Plant.

▲ **Tex., Austin**—BUILDINGS—Diocese of Texas, Episcopal Theological Seminary of The Southwest, Very Rev. Gray Blandy, Seminary Dean, 2607 University



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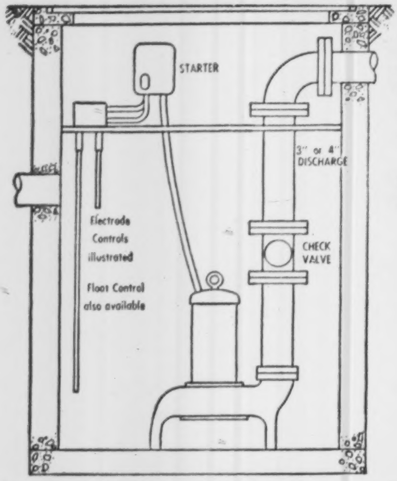

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Underground Lift Station with Submersible Pump in wet pit. Requires no pump house to mar the landscape. Duplex units furnished with alternators.

For Heavy Duty Installation—4" discharge—½ to 3 HP. See Bulletin SE 860. Max. dimensions: Dia. 23", Hgt. 28".

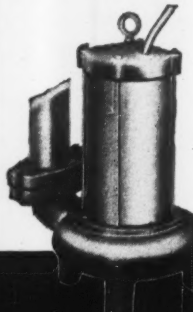

Fig. SE 860

weil PUMP CO.

1528 NORTH FREMONT ST., CHICAGO 22

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P. A. Sturtevant Co.
Addison Quality Illinois

Over 85% of the torque wrenches used in industry are

Sturtevant

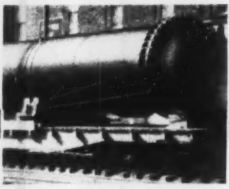
TORQUE WRENCHES

Read by Sight, Sound or Feel.

- **Permanently Accurate**
- **Practically Indestructible**
- **Faster—Easier to use**
- **Automatic Release**
- **All Capacities**

in inch ounces . . . inch pounds . . . foot pounds (All Sizes from 0-6000 ft. lbs.)

Every manufacturer, design and production man should have this valuable data. Sent upon request.



TIMBER-TREATING CYLINDERS

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We also design and fabricate elevated tanks, acid tanks, dye vats, digestors, standpipes, storage tanks, etc. Write for latest Cole catalog—"Tank Talk."

R. D. COLE MFG. CO.

NEWNAN, GA., Established 1854

TANKS • TOWERS • VESSELS CYLINDERS

Ave., plans by Mackie & Kamrath, 2713 Ferndale Pl., Houston and Fehr & Granger, 502 E. 5th St., Sect. 1, altering existing bldgs., dining hall, caretaker quarters, **$350,000;** Sect. 2, chapel-dormitory, **$300,000;** Sect 3, administration, **$350,000,** 32nd and Duval Sts.

Tex., Dallas—TRAINING CENTER—General Motors Corp., c/o Argonaut Realty Div., General Motors Bldg., Detroit, Mich., plans by Wyatt C. Hedrick Co., 1200 T. & P. Bldg., Fort Worth, 1 story, 135x285 ft. masonry, steel baydite block G. M. Training Center, air-conditioned. **$400,000.** CD 8/31.

Tex., Dallas—MEDICAL—Angus G. Wynne, Jr., c/o American Home Realty Co. and Wynnewood Village, Inc., 2311 Salerno St., plans by De Witt & Swank, 2025 Cedar Springs St., 2 story, 35,000 sq. ft. masonry medical bldg., air-conditioning, parking space for 200-cars. **$500,000.**

Tex., El Paso—TRAINING CENTER—General Motors Corp., c/o Argonaut Realty Div., General Motors Bldg., Detroit, Mich., plans by Wyatt C. Hedrick Co., 1200 T. & P. Bldg., Fort Worth, 1 story, masonry, steel, baydite block G. M. Training Center, air-conditioned **$350,000.**

▲ **Tex., Houston**—DWELLINGS, etc.—Arnold Building & Development Co., c/o A. V. Arnold, 2517 Wordsworth St., 34 brick, stone dwellings, concrete slab fdn., **$343,100;** 30 brick dwellings, concrete slab fdn., **$328,500;** 37 brick, stone dwellings, concrete slab fdn., **$375,000;** 80x247 ft. brick, concrete frame shopping center, **$350,000,** in an area of Graceland Terrace Addn.

Tex., Houston—SHOPPING CENTER—James H. Baumohl, 3202 McKinney St., masonry shopping center, Thornton and N. Shepherd Sts. **$325,000.**

Tex., Houston—CHURCH—First Christian Church Congregation, Main and Bell Sts., plans by Hamilton, Brown & Donald Barthelme, 2017 W. Gray St., church. **$750,000.** CD 6/23/52.

Tex., Houston—TRAINING CENTER—General Motors Corp., c/o Argonaut Realty Div., General Motors Bldg., Detroit, Mich., plans by Wyatt C. Hedrick Co., 1200 T. & P. Bldg., Fort Worth, 1 story, 135x825 ft., masonry, steel, baydite block G. M. Training Center, air-conditioned. **$400,000.**

Tex., Houston—DWELLINGS—Robert Newkirk, 11527 Memorial Dr., 10 two story brick, stone dwellings, concrete slab fdn., **$310,000;** nine 1 and 2 story brick, stone dwellings, air-conditioning, **$300,000;** 12 masonry dwellings, air-conditioning, in an exten. of Million Valley Forge addn.

▲ **Tex., Houston** — ADMINISTRATION, etc. — Sacred Heart Dominican College, 6501 Almeda St., plans by Coleman & Rolfe, 915 Woodrow St., administration and classroom units, **$300,000;** multi-purpose auditorium and dormitory, **$300,000;** home economics, library and physical education, **$365,000;** science bldg., **$350,000;** fine and liberal arts bldg., **$325,000.**

▲ **Tex., Houston**—COLLEGE INSTITUTION—Union Baptist Assn., 2420 Milam St., constr. new Baptist College Institution. **$1,000,000.**

Tex., Irving—DWELLINGS—John J. Stuart, 3628 Southwestern St., Dallas, and c/o Lynne Park, Irving, 18 brick dwellings, concrete slab fdn., **$300,000;** 20 brick, stone dwellings, concrete slab fdn., **$330,000.**

Tex., Nacogdoches—HOTEL—Nacogdoches Hotel Corp., Nacogdoches, plans by Edward B. Tucker, (consult.), Box 946, Nacogdoches, J. N. McCammon, Reserve Loan Life Bldg., Dallas and Carlos B. Schoeppl, 2701 Biscayne Blvd., Miami, Fla., 5 story hotel, Hospital and Fredonia Sts. **$800,000.** CD 12/19.

Tex., San Antonio—DWELLINGS—E. J. Burke & Sons, 1100 Goliad Rd., 34 frame dwellings, concrete slab fdn., **$340,000;** 31 frame dwellings, concrete slab fdn., **$316,000;** 29 brick or stone trim dwellings, concrete slab fdn., **$300,000,** in S.E. Highland Park area exten.

Tex., Port Arthur—CHURCH, etc.—Trinity Baptist Church Congregation, Port Arthur, plans by Wirtz, Calhoun, Tungate & Jackson, 2306 Richton St., Houston, 30,000 sq. ft., brick, veneer, concrete frame church and 5 educational units, **$400,000;** recreational hall and playgrounds, wading pool, addnl. educational bldg., **$350,000.**

Tex., San Antonio—DWELLINGS—Haby Seay, 833 Bandera Rd., 35 frame, masonry dwellings, concrete slab fdn., Lively and other streets. **$315,000.**

▲ **Tex., San Antonio**—HOTEL, etc.—H. B. Zachry Co., Transit Tower, plans by Carlos B. Schoeppl, 2701 Biscayne Blvd., Miami, Fla. and McCammon & Dilbeck, Reserve Loan Life Bldg., Dallas, 300-room hotel, **$3,750,000;** rein.-con. swimming pool, **$100,000;** laundry plant unit, **$90,000,** on Loop 13, across from McArthur Park, 2 mi. from Municipal Airport.

Tex., Silsbee—CHURCH, etc.—First Baptist Church, Silsbee, church and 2 story educational, masonry constr., **$300,000.**

Tex., Texas City—CHURCH—First Baptist Church Congregation, Texas City, plans by Wirtz, Calhoun, Tungate & Jackson, 2306 Richton St., Houston, church, educational, chapel, auditorium. **$300,000.** Rivoire & Poole, and R. L. Reid, 2506 Richton St., Houston, consult. engrs.

Wash., Vancouver—SCHOOL—St. Joseph's Roman Catholic Parish, 404 Andresen Rd., plans by L. A. Thomas, Regal Bldg., Portland, Ore., elementary school. **$300,000.**

▲ **Wash., Yakima**—YOUTH CENTER—Young Men's Christian Assn., Yakima, plans by J. W. Maloney, Central Bldg., Seattle, Zone 4, 4 story youth center bldg. **$1,250,000.** CD 11/2/48.

Wis., Green Bay—PAROCHIAL HIGH SCHOOL—Norbertine Fathers, Green Bay, plans by Foeller, Schober, Berners, Safford & Jahn, 310 Pine St., 5 unit 2 story parochial high school, incl. classrooms, auditorium chapel, gymnasium, faculty residence, cafeteria, misc. rooms and shops.

▲ **Wis., Milwaukee**—Apartment—Lodgewood Co., 2156 S. 4 St., Zone 4, plans by Fitzhugh Scott & Fitzhugh Scott, Jr., 5623 N. Lake Dr., Zone 11, 14 story, irregular, 82-83 unit apartment. **$1,000,000.** CD 6/17.

Ont., Cornwall—COLLEGE—Cornwall Classical College, Les Clercs St. Viateur, plans by Jean-Marie Lafleur, 17 Nicholson St., Valleyfield, Que., 2 story, 60x313 ft., college, laboratories, library, gymnasium and residence at Windmill Point, Montreal Rd., **$500,000.** CD 9/17.

Ont., Sarnia—DEPARTMENT STORE—Simpson-Sears Ltd., Yonge and Richmond Sts., Toronto, 60,000 sq. ft. department store, on 10-acre site at Exmouth and Colborune Sts., and parking space, **$500,000.**

▲ **Ont., Toronto**—OFFICE—Continental Casualty Co., 800 Bay St., plans by Marani & Morris, 1250 Bay St., 7 story, bsmnt., 140x140 ft., brick, steel frame office Bloor and Church Sts. **$1,000,000.**

▲ **Ont., Toronto**—OFFICE—Strong-McIlraith Ltd., King Edward Hotel, plans by Herbert Horner, 259 Inglewood Dr., 6 story, 42x156 ft. office, Yonge and Bloor Sts. **$1,000,000.**

Que., Ste. Anne de la Pocatiere—RETREAT HOUSE—Rev. Fr. Oblates of Mary Immaculate, R. P. S. Cote, cure, 2 story, 36x200 ft., closed retreat house, etc. **$300,000.**

INDUSTRIAL BUILDINGS

Ala., Birmingham—WAREHOUSE—Marks-Fitzgerald Furniture Co., 3301 10 Ave. N., rebuilding warehouse **$100,000.**

Calif., Orange—FACTORY, etc.—Anaconda Wire & Cable Co., c/o Wm. J. Moran Co., engr., 1011 S. Fremont Ave., Alhambra, 1 story, 85,000 sq. ft., factory and warehouse, **$400,000.**

Fla., Gainesville—PLANT—The Sperry Corp., 30 Rockefeller Plaza, New York, N. Y., plant, **$500,000.**

Fla., Miami—WAREHOUSE, etc.—Firestone Tire & Rubber Co. 1200 W. Flagler St., warehouse-service station, N.E. 2 Ave. **$125,000.** Jorgensen & Schreffler, Biscayne Bldg., consult. engrs.

Ill., Chicago—PLANT—Columbia Printing Co., 1632 N. Halsted St., 1 story, 16,000 sq. ft. printing plant, Wrightwood and Paulina St. **$125,000.** Bruce Gordon, 1 N. La Salle St., Zone 2, consult. engr.

Ind., South Bend—WAREHOUSE—Sears, Roebuck & Co., 925 S. Homan St., Chicago, Ill., 70,000 sq. ft., 1 story warehouse, W. Sample and S. Camden Sts. **$300,000.**

Kan., Leavenworth—GARAGE, SERVICE and SALES—Collard Chevrolet Co., 600 Delaware St., plans by Swanson, Terney & Brey, 216 E. 10 St., Kansas City, Mo., garage, service and sales bldg. **$200,000.** CD 8/12 under LB.

Total Patching Cost

(Materials, labor, processing)

$3.75 per ton

with the H&B Moto-Patcher

● Here's an example of the way the Moto-Patcher cuts patching costs. According to Mr. Fred Tayntor, Commissioner of Public Works, Rome, N. Y., prior to May 15 their Moto-Patcher had mixed over 1500 tons of patch material (50% ¾" stone—50% ¼" stone) with RC No. 3 cutback as the bituminous material. The total cost, including materials, labor and processing, was $3.75 per ton.

This mobile mixing unit delivers up to 10 tons per hour of freshly mixed material. Automatic control of the metering of the asphalt and feeding of the aggregate insures a constantly uniform mix. The 400 gallon tank, which is an integral part of the unit, provides an adequate supply of bitumen—making frequent stops unnecessary. Aggregate may be either shoveled into the hopper or fed in by gravity directly from a truck by means of a small elevator (optional equipment) as shown above.

Other optional equipment includes a specially designed dryer and adjustable spreader attachment.

For further information send for Bulletin MPD-53

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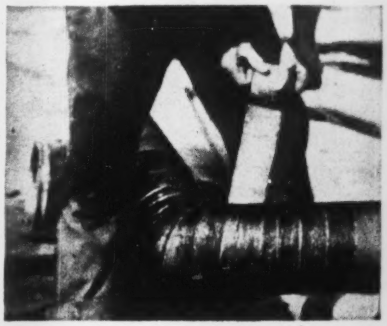
Specify TAPECOAT

. . . the Original Coal Tar Tape Protection for Pipe, Pipe Joints, Couplings and Tanks



TAPECOAT is a coal tar coating with a tar-saturated, close-woven fabric as a carrier for easy application, providing a *natural* protection against corrosion.

TAPECOAT serves as both bond and protection . . . requires no foreign adhesive.

TAPECOAT resists moisture, acids, alkalis, soil stress, electrolysis, chemical fumes, fly ash, salt water, salt-laden air, barnacles and other severe corrosive and abrasive conditions.

TAPECOAT is clean to handle and easy to apply by spiral or "cigarette" wrapping with the use of a torch to bleed the coating for a bond to the surface. It cuts maintenance and replacement costs.

SIZED TO THE JOB

TAPECOAT comes in rolls of 2", 3", 4", 6", 18" and 24" widths to meet varying requirements.

TAPECOAT has proved its dependability for gas and oil companies, railroads, telephone companies, air lines, ship builders and operators, water and sewage works, chemical and industrial plants, engineers and contractors . . . in combating corrosion both underground and above ground.

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The TAPECOAT Company

Originators of Coal Tar Tape Protection

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HOW TO HANDLE
WET JOBS

SINCLAIR PIPELINE
East Chicago, Ill.

Contractor: O. R. Burden Const. Co.

WELLPOINT PUMPS HANDLE
22 FT SUCTION LIFT

LOWERING 16 ft of water at this lift would ordinarily mean placing wellpoint system on a berm below ground. Actually, as photo shows, results were achieved in the simplest way, without additional excavation, the wellpoint line and pumps working from street level. Other noteworthy items revealed by the photo include: (a) pre-drainage with wellpoints on only one side of wide trench; (b) the open-cut method, eliminating costly sheeting.

• The foregoing are typical of the efficiencies of the Griffin Wellpoint systems (several used continuously) on this vast project which involved mile on mile of digging, with the majority of the pipelines laid far below ground water table in deep trenches containing water-bearing sands. Progress rate? Even in many of the swampland sections, it topped 500 ft per day. For "quick-dry" . . . specify . . . Griffin.

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WELLPOINT CORP.
881 East 141st Street, New York 54, N. Y.
Hammond, Ind. Houston, Tex. Jacksonville, Fla.
In Canada: Construction Equipment Co., Ltd.
Toronto Montreal Halifax

Ky., Louisville—PLANT—Hirsch Brothers & Co., 14 and Cedar Sts., Zone 3, have not selected engineer or architect on plant for Louisville. (Correction of report. CD 9/2).

La.,New Orleans—PLANT—Victor Huber & Sons, 4841 Canal St., plans by Erston Reisch, 4726 S. Carrollton Ave., plant addn. **$200,000.**

▲ **Mich., Plainfield**—PLANT—Worthington Corp., 2824 E. Grand Blvd., Detroit, brick, masonry plant expansion addn., incl. assembly structure, **$1,000,000.**

N. H., Laconia—TERMINAL, etc.—F. S. Willey, c/o Norman P. Randlett, archt., 614 Main St., truck terminal and office. **$115,000.**

N. Y., New York—WAREHOUSE—Providence Produce Warehouse Co., 3615 Grand Central Terminal, Zone 17, plans by Max Siegel, 1841 Broadway, Zone 23, 1 story warehouse, Leggett Ave., west of Barry St. **$850,000.**

Okla., Dacoma—GRAIN ELEVATOR—Farmers Co-op. Assn., Dacoma, 250,000 bu. concrete grain elevator. **$150,000.** J. E. Grimes, c/o owner, engr.

▲ **Pa., Erie**—FOUNDRY, etc.—American Sterilizer Co., 1230 Plum St., foundry, warehouse, metal fabrication plant, laboratory to manufacture hospital equip. **$1,000,000.**

S. C., Starr—PLANT—Starr Industrial Buildings, c/o W. P. Pettigrew, Starr, textile plant. **$500,000.**

Tex., Houston—PLANT—Clark Wire & Supply Corp., 2450 Holmes Rd., 80,000 sq. ft. plant bldg. mfg. screen wire, bldg. steel and wire products. **$350,000.**

Tex., Sherman-Denison—STORAGE—Magnolia Petroleum Co., Magnolia Bldg., Dallas, petroleum products storage, Hy. 75, midway between Sherman and Denison, **$375,000.**

Tex., Sweetwater—PLANT—30-Well White Flat Pool Sweetwater, cycling plant, **$500,000.**

▲ **Va., Hornsbyville**—REFINERY—Pan American Refining Corp., (refining affiliate of American Oil Co.), 122 E. 42 St., New York, N. Y., oil refinery, option taken on 1,000 acres of property, **$25,000,000.**

▲ **Va., Staunton**—FACTORY—Westinghouse Air Conditioning Div., Westinghouse Corp., P.O. Box 868, Pittsburgh, Pa., plans by Robert & Co., 96 Poplar St. N.W., Atlanta, Ga., 300,000 sq. ft. industrial plant to manufacture air-conditioning equip. **$2,000,000.** CD 9/16.

Alaska, Juneau—TERMINAL—Puget Sound Tug & Barge Co., 3414 Iowa St., Seattle, Wash., barge service terminal. **$200,000.**

UNCLASSIFIED

California—POLE LINE—Anza Electric Co-operative, Anza, 114 mi. pole line from Lake Hemet to Palm Springs, Riverside Co. **$500,000.** Tynes & Loftin, Korber Bldg., Albuquerque, N. M., consult. engrs. CD 4/16/52.

Conn., Greenwich—PARKING LOTS—Bd. Selectmen, Greenwich, two public parking lots in Greenwich Ave. area, **$260,000.**

Mass., Brighton—TELEVISION and RADIO CENTER, etc.—R. C. Diocese of Boston, Most Rev. Richard J. Cushing DD, archbishop, 1 Lake St., plans by Whelan & Westman, 7 Water St., Boston, masonry television and radio center, chapel, St. John's Seminary Grounds. **$260,000.**

Neb., North Platte—PARK—City, North Platte, athletic and base ball park. **$100,000.**

N. Y., Whitestone—COMFORT STATION, etc.—Dpt. Parks, Arsenal Bldg., New York, comfort station and playground, 12 Ave., west of 154 St. **$138,000.** Andrews, Clark & Buckley, 305 E. 63 St., New York, Zone 21, engrs.

O., Parma—SWIMMING POOLS—City, City Hall, 6611 Ridge Rd., bond election No. 3, two municipal swimming pools. **$300,000.** CD 9/16.

O., University Heights—SWIMMING POOL—City, 2300 Warrensville Center Rd., bond election Nov. 3, municipal swimming pool. **$150,000.**

O., Upper Arlington—SWIMMING POOLS—Village, bond election Nov. 3, two swimming pools. **$150,000.** C. A. Niple, c/o owner, engr.

Okla., Vinson—RADIO STATION—Continental Pipe Line Co., Ponca City, base radio station, **$175,000.**

Texas—TELEPHONE LINES—Southwest Texas Telephone Co-operative, Dilley, 412 mi. new pole telephone lines, **$250,000** lines only. $331,000 total amt. for imprvs. $70,000 REA allot.

Tex., Beaumont—RADIO STATION UNITS—Sun Pipe Line Co., Beaumont, 2 fixed developmental radio station units, **$200,000.**

Tex., Houston—OCEAN FRONT PROJECT—Gulf Beach Club, c/o Michael DeGeorge, c/o Ambassador Hotel, plans by Wylie W. Vale, 517 W. Gray St., hunting club and fishing proj., ocean front project, recreational, incl. fishing, boating, bathing facilities, etc. **$250,000-$300,000.**

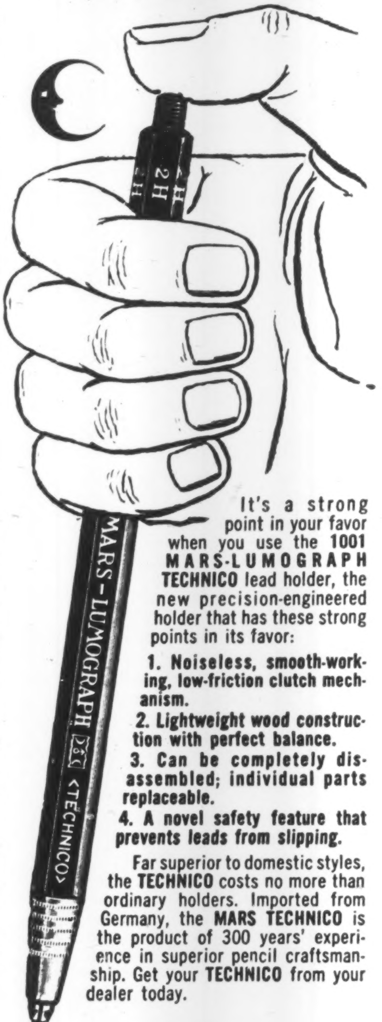
Tex., Houston—RADIO STATION—Humble Pipe Line Co. 1216 Main St., radio station unit, near here. **$200,000.**

Tex., Midland—RADIO STATION—El Paso Natural Gas Co., Bassett Tower Bldg., El Paso, radio station (base), **$250,000.**

Wash., Seattle—SWIMMING POOL—City, County-City Bldg., Zone 4, swimming pool at Catherine Blaine Junior High School, **$240,000.**

▲ **Wash., Yakima**—GRAND STAND—Central Washington Fair Assn., Yakima, grand stand. **$1,000,000.**

Make it a point—USE
MARS-LUMOGRAPH
"TECHNICO"

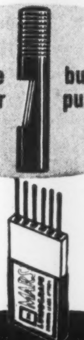


It's a strong point in your favor when you use the 1001 MARS-LUMOGRAPH TECHNICO lead holder, the new precision-engineered holder that has these strong points in its favor:

1. Noiseless, smooth-working, low-friction clutch mechanism.
2. Lightweight wood construction with perfect balance.
3. Can be completely disassembled; individual parts replaceable.
4. A novel safety feature that prevents leads from slipping.

Far superior to domestic styles, the TECHNICO costs no more than ordinary holders. Imported from Germany, the MARS TECHNICO is the product of 300 years' experience in superior pencil craftsmanship. Get your TECHNICO from your dealer today.

A fine lead sharpener built into the push-button cap



1904 MARS-LUMOGRAPH imported drawing leads in 18 degrees are rifled to assure a perfect grip, do not flake, will not smudge. 10 cents each—less in quantity. Cost no more than domestic brands.

SINCE 1662
J.S. STAEDTLER, INC.
53-55 Worth Street
NEW YORK 13, N.Y.

Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

BIDS ASKED—BUILDINGS

N. H., Nashua—CHURCH—B.A. 10/16—Infant Jesus Roman Catholic Parish, Most Rev. Bishop Matthew F. Brady, DD, Rev. Henry A. Blanchard, pastor, 121 Allds St., church, Allds St., corner Harbard St. $325,000. Dirsa & Lampron, 922 Elm St., Manchester, archts. CD 5/26.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

NEW HAMPSHIRE—State Dpt. P. Wks. & Hys., Concord,
Frank J. Shields, 91 Central St., Southbridge, Mass. LB $170,616, road mix 2.129 mi. N.H. 13, **Proj. No. S 17 (3), Milford. Bids Sept. 24. CD 9/16.**

MIDDLE ATLANTIC

BIDS ASKED—HEAVY CONSTRUCTION

MARYLAND—B.A. 10/13—State Rds. **Comn., 108 E.** Lexington St., Baltimore, Zone 2,
Anne Arundel Co.—wid'n. resurf. 4.981 mi. State Rte. 2, near Revell, Contr. AA 453-4-515.
wid'n. resurf. 5.014 mi. State Rte. 2, near Robinson, Contr. AA 453-3-513.
Frederick Co.—grading, drainage, surf. 2.618 mi. State Rte. 71, near New Midway, Contr. F 508-3-715. Plans deposit $5 each. Wm. F. Childs Jr., c/o owner, ch. engr.

Md., Baltimore—B.A. 10/14—City, Bureau Sewers, 312 Municipal Bldg., Zone 2, Contr. 308, storm drains. Plans deposit $5, John J. Hunt, c/o owner, sewerage engr. CD 11/17/50.

Pa., State College—STEAM GENERATION, etc.—B.A. 10/14—General State Auth., 18 and Herr Sts., Harrisburg, (2nd Sect.) addns. to steam generation and electrical distr. sys., Pennsylvania State College. $150,000. Plans deposit $10. H. F. Lenz, 227 Franklin St., Johnstown, engr.

NEW JERSEY—B.A. 10/20—State Hy. Dpt., State Hy. Office Bldg., 1035 Parkway Ave., Trenton,
Camden Co.—wid'n., resurf. incl. drainage imprvs. 5.584 mi. at Watsontown Rd. Route 43 (1927) U. S. 30 (1953), Section 11-D, from Clarks Branch to Route 73 Interchange. Plans deposit $10; adv. ENR 10/8.

Pa., Cheyney—ELECTRICAL DISTR. SYS,—B.A. 10/21—General State Auth., 18 and Herr Sts., Harrisburg, renovating electrical distr. sys., Cheyney State Teachers' College. $100,000. Plans deposit $2.50. A. F. Jones, c/o owner, ch. engr.

PENNSYLVANIA—B.A. 10/23—State Hy. Dpt., 506 N. Office Bldg., Harrisburg,
Philadelphia Co.—constr. 18,639 ft. divided hy. of plain c. conc. base with bit. surf. variable in width, one three-span I-beam bridge, U. S. 1 (Roosevelt Blvd.), Phila. Plans deposit $25. C. H. Buckius, c/o owner, ch. engr.

† **New Jersey**—B.A. About 10/30—U. S. Eng., 121 N. Broad St., Phila. 1, Pa., stone protection, North Bulkhead at Manasquan Inlet, Manasquan River, CIVENG-36-109-54-16.

BIDS ASKED—BUILDINGS

Pa., St. Marys—HIGH SCHOOL—B.A. 10/15—St. Marys-Benzinger Joint School Dist., St. Marys, Junior-Senior High School. $840,000. Plans deposit $25. Hunter, Caldwell & Campbell, 3601 Fifth Ave., Altoona, archts.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **National Structures Corp.**, 4-34 26 Ave., Long Island City 2, N. Y. CA **$1,597,444,** coal and ash handling facilities for 74th St. Power Plant, Contr. P-78, NEW YORK, N. Y. Transit Auth., 370 Jay St., Brooklyn 1, N. Y. Bids Sept. 18.

MARYLAND—State Rds. Comn., 108 E. Lexington St., Baltimore
M. J. Grove Lime Co., Lime Kiln, Md. LB **$606,651.** grading, drainage, surf. 3.25 mi. U. S. Rte. 15, Thurmont-Emmittsburg, Contr. F 522-1-715, Frederick Co. Bids Sept. 22. CD 9/10.

MARYLAND—State Rds. Comn., 108 E. Lexington St., Baltimore, Zone 2,
Williams Constr. Co., Box 145, Baltimore, Md. CA **$1,354,080.** grading, pipe culvert installation, surf. 3.73 mi. relocated U. S. Rte. 240 near Clarksburg, Contr. M 383-1-315, Montgomery Co. CD 9/15, under LB.

American Paving & Contg. Co., 2525 Loch Raven Rd., Baltimore, Md. LB **$94,950.** Contr. 1265, sheet asph. resurf., BALTIMORE, MD. City, Bureau Hys., 303 Municipal Bldg., Baltimore 2, Md. Bids Sept. 23. CD 9/16.

BUILDINGS

LOW BIDS AND CONTRACTS

Tidewater Building Co., 101 Park Ave., New York 17, N. Y., CA **$600,000.** BANK, 389-97 Jay St., BROOKLYN, N. Y. Fulton Savings Bank, 375 Fulton St., Brooklyn, N. Y. CD 10/17.

▲ **Foxcroft, Inc.,** 16 Park Ave., Baltimore, Md. Owner Builds. **$1,087,000.** one hundred and forty-five 2 story, 19x28x28 ft. brick, row type HOUSES, 1700 and 1800 blocks Sherwood Ave., 1700, 1800 and 1900 blocks Wadsworth Way, 1700 and 1800 blocks Lydonlea Way, BALTIMORE, MD. CD 9/9.

Jack Meyerhoff & Sons Co., 14 W. Saratoga St., Baltimore, Md. Owner Builds. **$300,000.** thirty-nine 2 story, 19x32x30 ft. row type HOUSES, 1200 block Meridene Dr., BALTIMORE, MD. CD 9/10.

▲ **Wesley Buchanan & D. Gingery,** 1614 K St. N.W., Wash., D. C. Owner Builds. **$6,000,000.** 500 frame HOMES Dawson Farm, ROCKVILLE, MD. Pierre Ghent & Assoc., 1836 Jefferson Pl. N.W., Wash., D. C., land planners.

SOUTH

BIDS ASKED—HEAVY CONSTRUCTION

SOUTH CAROLINA—B.A. 11/17—State Hy. Dpt., Columbia,
Spartanburg Co.—wid'n North Church St. in city of Spartanburg. $450,000. CD 3/26.

Tenn., McMinnville—B.A. 10/14—City, WW imprvs. $500,000. Plans deposit $25. J. Sanders Parker, 816 8th Ave. S., Nashville, engr. CD 6/29.

La., Baker—B.A. 10/15—Village, WW imprvs. Barnard & Burk, 1023 Nicholson Dr., Baton Rouge, engrs. CD 11/28.

La., Baker—NATURAL GAS DISTRIBUTION SYSTEM—B.A. 10/15—Village, natural gas distr. sys. addns. Plans deposit $10. Barnard & Burk, 1023 Nicholson Dr., Baton Rouge, engrs. CD 11/28.

N. C., Mount Airy—B.A. 10/15—Town, Contr. 2, water sys. imprvs. Extended date. J. N. Pease & Co., Inc., 119½ E. Fifth St., Charlotte, engr. CD 9/28.

Va., Clarksville—B.A. 10/16—Town, Town Hall, sewage disposal plant. Plans deposit $15. William F. Freeman, High Point, N. C., engr. CD 8/26.

La., Natchitoches—B.A. 10/19—City, water well, Fromherz Engineers, 823½ Poydras St., New Orleans, engrs.

▲ **GEORGIA**—B.A. 11/6—Georgia State Toll Bridge Auth., 2 Capitol Square, Atlanta,
Camden Co.—bridge over Satilla River on Hy. 25. $1,400,000;
Floyd Co.—bridge over Oostanaula River in Rome, $1,200,000;
Tattnall and Appling Counties—bridge over Altamaha River on Hy. 64, $650,000. CD 4/15.

▲ **Louisiana**—VEHICULAR TUNNEL—B.A. 1/6—State Hy. Dpt., Highway Office Bldg., Baton Rouge, vehicular tunnel under Harvey Canal, Jefferson Parish. $5,666,136. CD 3/31.

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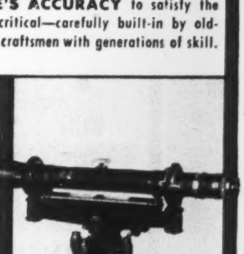
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Pittsburgh:....American Blueprt., 110 Sixth St.
Portland, Ore: J. K. Gill, S.W. 5th Ave. & Stark
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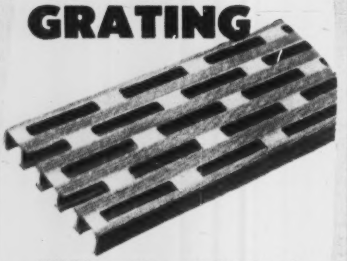

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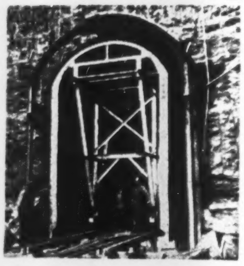

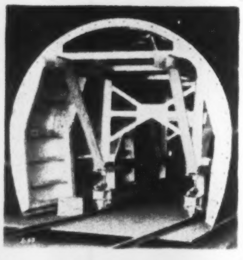

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BIDS ASKED—BUILDINGS

S. C., Marion—SCHOOL—B.A. 10/14—Marion Co. Bd. Educ., Marion, Terrell's Bay Elementary-High School. $500,000. C 4/15.

La., New Orleans—AUTO SALES AND SERVICE—B.A. About 10/15—Pontchartrain Motor Co., 719 Baronne St., New Orleans, auto sales and service bldg. $500,000, Edward B. Silverstein, 302 Magazine St., archt. CD 7/22.

Tenn., Ripley—WAREHOUSE, etc.—B.A. 10/15—Ripley Power & Light Co., Ripley, warehouse-office. $100,000.

S. C., McCormick—SCHOOL—B.A. 10/19—McCormick Co. Bd. Educ., McCormick Plum Branch Elementary School. $300,000. Scroggs & Ewing, 1331 Greene St., Augusta, Ga., archts.

La., Angola—BLOCK BUILDING—B.A. 10/20—State Bldg. Auth., State Capitol, Baton Rouge, all block bldg. at Louisiana State Penitentiary. Plans deposit $50, Curtis & Davis, 822 Perdido St., New Orleans, archts. CD 9/26/52.

Ga., Statesboro—HOSPITAL, etc.—B.A. 10/21—Bulloch County, Statesboro, hospital addns., alterations. Extended date. Wm. J. J. Chase & Assocs., Chandler Bldg., Atlanta, Ga. archts. CD 9/15.

Miss., Corinth—SCHOOL—B.A. 10/21—Corinth Municipal Separate School Dist., negro high school, $325,000. CD 12/2.

Fla., Tallahassee—MEN'S DORMITORY—B.A. 10/22—Florida State Bd. Control, Education Bldg., Florida State University, Tallahassee, men's dormitory at Florida A & M College, $750,000. CD 3/17/49, under LB.

La., Angola—BOILER HOUSE—LAUNDRY—B.A. 10/22—State Bldg. Auth., State Capitol, Baton Rouge, boiler house-laundry at Louisiana State Penitentiary. Plans deposit $50, Curtis & Davis, 822 Perdido St., New Orleans, archts. CD 9/21, under LB.

Ala., Oneonta—COURT HOUSE—B.A. 10/23—Blount Co., Court House, court house, $425,000. Extended date. Martin J. Lide, Brown-Marx Bldg., Birmingham, archt. CD 8/25.

S. C., Bishopville—SCHOOLS B.A. 10/28—Lee Co. Bd. Educ., Bishopville, Dennis Elementary-High School. $650,000. Plans deposit $75. James & Durant, Sumter, archts. CD 6/18.

La., Ville Platte—SCHOOL—B.A. 10/29—Evangeline Parish School Bd., James Stephen Negro Elementary High School, $500,000. Plans deposit $40. Extended date. CD 9/9.

S. C., Walterboro—SCHOOL—B.A. 10/30—Colleton Co. Bd. Educ., Walterboro, elementary school. $320,000. Plans deposit $50. John H. Truluck, Jr., P. O. Box 19, archt.

▲ **Tenn., Nashville**—FARMERS MARKET—B.A. 11/1—Farmers Market Comn., Court House, general contracts, farmers market. $1,000,000. CD 5/2/52.

Ala., Geneva—HOSPITAL—B.A. 11/18—Geneva Co., Geneva, hospital, $450,000, Sherlock, Smith & Adams, 303 Washington St., Montgomery, archts.

SOON LETS CONTRACT—BUILDINGS

Fla., Fort Lauderdale—OFFICE—Atlantic Federal Savings & Loan Assoc., c/o Robert E. Hansen, 311 S.E. 16 Ave., soon lets contract office bldg. $300,000.

Fla., Gainesville—BANK—First National Bank, Gainesville, soon lets contract bank, $400,000. Bank Building & Equipment Co., 9 and Sidney Sts., archt.

Tenn., Memphis—WAREHOUSE—Bluff City Distributing Co., 905 Union Ave., soon lets contract, warehouse, $125,000. Walk C. Jones-Walk C. Jones, Jr., 1215 Poplar St., archts. CD 4/29.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

VIRGINIA—State Hy. Dpt., 1221 E. Broad St., Richmond, **McLean Contg. Co.**, 1301 Fidelity Bldg., Baltimore 1, Md., LB **$571,417**, Contr. No. 1-A, grading, approach roadway and substructure for approach spans of bridge, Greys Point and Whitestone, Proj. 3469-01, Rte. 200, Middlesex and Lancaster Counties. Bids Sept. 24. CD 9/9.

Payne & Oliver, 901 Leesburg Pike, Falls Church, Va., LB **$82,772**, 7,150 lin. ft. storm drains, 4,200 lin. ft. curb and gutter and other street work, FALLS CHURCH, VA. City, 126 E. Broad St., Falls Church, Va. Bids Sept. 21. CD 1/15.

▲† **McLean Contg. Co.**, 1301 Fidelity Bldg., Baltimore 1, Md. CA **$2,883,000**, Little Creek Cove piers, ramps and quays, Naval Air Base, NOY 78212, LITTLE CREEK, VA. P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, Norfolk, Va. Bids Sept. 15. CD 9/21, under LB.

† **P. Wks. Office**, Fifth Naval Dist., U. S. Naval Base, Norfolk, Va., rejected bids July 21, boiler feed and treated water pumps, Naval Air Base, NOY 78278, LITTLE CREEK, VA.

Randolph Constr. Co., Asheboro, N. C. CA **$49,508**, water lines, GASTONIA, N. C. City, City Hall, Gastonia, N. C. Bids Sept. 11.

M. G. Aldridge, 1045 Patterson St., Macon, Ga., CA **$199,010**, sanitary sewer imprvs., WEST COLUMBIA, S. C. City, West Columbia, S. C. Bids Sept. 16.

M. G. Aldridge, 1045 Patterson St., Macon, Ga. CA **$112,451**, WW imprvs., WEST COLUMBIA, S. C. City, West Columbia, S. C. Bids Sept. 16.

Claussen-Lawrence Constr. Co., 130 Gwinnet St., Augusta, Ga., CA, **$388,605**, imprv. Henry, Montgomery and Price Sts.;

Espy Paving & Constr. Co., E. Bay St., Savannah, GA., CA, **$191,485,** repaving Bay St., SAVANNAH, GA. City, City Hall, Savannah, Ga. Bids Sept. 18. CD 8/27.

City, City Hall, Clewiston, Fla., Owner Builds, **$80,000** paving 5 mil. city streets, CLEWISTON, FLA.

†**Huffman-Wolfe Southern Corp.**, P. O. Box 1248, Atlanta, Ga. LB, **$197,200,** addn. to steam plant and lines, Patrick Air Force Base, Inv. 54-13, COCOA, FLA. U. S. Eng., P. O. Box 4970, Jacksonville, Fla. Bids Sept. 16. CD 8/10.

City, City Hall, Panama City, Owner Builds, **$131,226** street imprvs., PANAMA CITY, FLA.

Sullivan, Long & Hagerty, 2026 2 Ave., Bessemer, Ala., LB, **$647,000**, water filtration plant addns., TAMPA, FLA. City, City Hall, Tampa, Fla. Bids Sept. **22.** CD 8/31.

Saine Co., Inc., P. O. Box 2107, Orlando, Fla., CA, **$77,902** WW imprvs., TITUSVILLE, FLA. City, Titusville, Fla. Bids Sept. 15. CD 9/4.

▲ **ALABAMA**—State Hy. Dpt., Montgomery,

Moss-Thornton Co., Box 127, Leeds, Ala., CA, **$1,669,285** bit. plant mix. 6.749 mi. U. S. 78, F.I. 203 (4), Jefferson Co.;

Clyde O. Mitchell, 104 N. 44 St., Birmingham 6, Ala., CA, **$659,324,** bit. 6.52 mi. Montgomery-Wetumpka Road, F-86 (2), Elmore Co.;

A. E. Burgess Co., 3700 10 Ave., N, Birmingham, Ala., CA, **$540,215,** 10.218 mi. grading, drainage F-22 (2) and 108 (5), Colbert Co. Grand total **$2,868,824.** Bids Sept. 11. CD 9/18, under LB.

▲ **Sullivan, Long & Hagerty**, 2026 2 Ave., Bessemer, Ala., LB, **$2,069,731,** Village Creek Sewage Treatment Plant, Contract No. 2, Ensley, BIRMINGHAM, ALA. Jefferson Co. Comm., Jefferson Co., Court House, Birmingham, Ala. Bids Sept. **22.** CD 8/10.

Cunningham-Limp Co., 3087 W. Grand Blvd., Detroit, Mich., CA, **$150,000,** television station, Station WSR-TV, BIRMINGHAM, ALA. Birmingham Broadcasting Co., Radio Park, Birmingham, Ala.

McGowen Contg. Co., Opelika, Ala., CA, **$171,765** WW imprvs., BRIDGEPORT, ALA. City, City Hall, Bridgeport, Ala. Bids Sept. 15.

Tri-Cities Constr. Co., 3009 Jackson Hy., Sheffield, Ala. CA, **$518,170,** WW imprvs., FLORENCE, ALA. City, Florence, Ala. Bids Sept. 17. CD 8/25.

Vandergriff Constr. Co., N. Court St., Montgomery, Ala. CA, **$68,300**, grading, paving 1½ mi. from North Court Rd. to Boylston, Montgomery Co., MONTGOMERY, ALA. Montgomery Co., Court House, Montgomery, Ala. Bids Sept. 22.

Paul Anthony Constr. Co., P.O. Box 364 Tupelo, Miss. CA **$67,500**. road and bridge imprvs. on 3 county roads, ACKERMAN, MISS. Bd. Supervs., Choctaw Co., Ackerman, Miss. Bids Sept. **17.**

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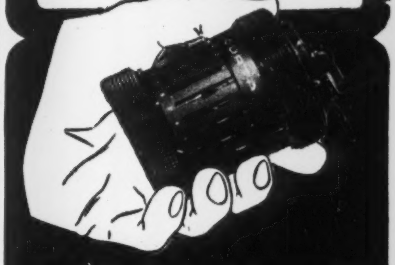

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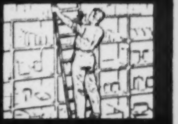

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Dickerson & Bowen, Brookhaven, Miss. CA **$286,201.** grading, paving 9.295 mi. between Hollandale and Murphy, GREENVILLE, MISS. Bd. Supervs. Washington Co., Greenville, Miss. Bids Sept. 15. CD 8/27.

Barber Bros., 2636 Dougherty Dr., Baton Rouge, La. CA **$62,173.** Phase 4 Stanford Ave.-North 33 St. Expressway, BATON ROUGE, LA. City, City Hall, Baton Rouge, La. Bids Sept. 16. CD 6/29/50.

Clement Betpouey Jr. & Co., National Bank of Commerce Bldg., New Orleans, La. CA **$240,077.** WW., natural gas transmission line, distr. sys., fire protection sys., GREENSBURG, LA. St. Helena Parish Police Jury, Greensburg, La. Bids Sept. 19. CD 9/21, under LB.

T. L. James & Co., Kenner, La. CA **$69,000.** c. conc. pave 6 streets, GRETNA, LA. Jefferson Parish Police Jury, Gretna, La. Bids Sept. 16. CD 9/4.

Drainage Dist. 1, West Monroe, La. rejected bids Sept. 10, Pumping Station C, West Monroe, MONROE, LA. LB **$61,765.** CD 9/22, under LB.

Harry & R. J. Sognet, P.O. Box 133, Thibodaux, La. CA **$131,500.** concrete athletic stadiums at 5 high schools, THIBODAUX, LA. Lafourche Parish School Bd., Thibodaux, La. Bids Sept. 23. CD 3/10, under Public Buildings.

City, City Hall, Pulaski, Tenn. Owner Builds. **$200,000.** imprv. electric sys. PULASKI, TENN.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Southwestern Constr. Co.,** Peoples Bldg., Charleston, W. Va. CA, **$2,682,000,** 3 story, 135-bed HOSPITAL, HUNTINGTON, W. VA. Cabell County General Hospital, Huntington, W. Va. Bids Sept. 2. CD 9/11, under LB.

† **J. A. Jones Constr. Co.,** P.O. Box 966, Charlotte, N. C., LB **$352,353.** A.Q.M. Air Items WAREHOUSE, ENG-31-075-54-5, FORT BRAGG, N. C. U. S. Eng., 308 Customhouse, Wilmington, N. C. Strobel & Salzman, 70 W. 40 St., New York, N. Y., engrs.-archts. Bids Sept. 17. CD 8/28.

Lee Constr. Co., P.O. Box 1378, Charlotte, N. C. CA **$150,000.** PLANT addn., STONEVILLE, N. C. Baxter, Kelly & Faust, Inc., Stoneville, N. C. Bids Sept. 16.

Ruscon Constr. Co., P.O. Box 275, Charleston, S. C. LB **$552,543,** HOSPITAL addn., ORANGEBURG, S. C. Orangeburg Regional Hospital, Orangeburg, S. C. Bids Sept. 22. CD 8/28.

S. A. Pope, 356 Pickens St., Rock Hill, S. C., CA **$105,998,** AUTO SALES and SERVICE BLDG., ROCK HILL, S. C. Cox Motor Co., Rock Hill, S. C. CD 9/8.

Avery Lumber Co., Sumter, S. C., LB **$385,875.** 50,000 sq. ft. Manchester SCHOOL, Pinewood, SUMTER, S. C. Sumter Co. School Dist. 2, Sumter, S. C. Bids Sept. 15. CD 8/28.

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C. O. Smith Fertilizer Co., Moultrie, Ga., Owner Builds, **$200,000,** fertilizer PLANT, DOUGLAS, GA.

Batson-Cook Co., West Point, Ga., CA, **$331,000.** SCIENCE bldg. at Georgia State College for Women, MILLEDGEVILLE, GA. Bd. Regents, University System of Georgia, 20 Ivy St. S.E., Atlanta, Ga. Bids Sept. 22. CD 8/27.

J. H. Mann & Son, Rt. 2, Box 105, Fort Meade, Fla., CA **$366,512,** High SCHOOL, Auburndale, BARTOW, FLA. Polk Co. Bd. P. Instruction, Bartow, Fla. Bids Sept. 22. CD 9/4.

Henry L. Hanna, 825 S. Atlantic St., Daytona Beach, Fla. Owner Builds, **$300,000** APARTMENT, DAYTONA BEACH, FLA.

Crouch Bros., 510 S.W. 2 Ave., Dania, Fla., CA, **$125,000.** AUTO SALES and SERVICE, HALLANDALE, FLA. Atlantic Shores Co., c/o contractor.

Arthur Perry, Inc., 1746 E. Adams St., Jacksonville, Fla. LB, **$546,350,** OFFICE, JACKSONVILLE, FLA. State Farm Mutual Insurance Co., Bloomington, Ill. CD 5/7.

Everett W. Martin & Son, 1602 S.W. 27 Ave., Miami, Fla., CA, **$440,000,** APARTMENT, MIAMI, FLA. Terrace Garden Apartments, c/o contractor.

B. A. Schiff, 901 S.W. 69 Ave., Miami, Fla., Owner Builds, **$100,000,** WAREHOUSE addn., MIAMI, FLA.

Bradford Builders, Inc., 1101 Lincoln Road Bldg., Miami Beach, Fla., CA, **$100,000,** Construction equipment SALES and SERVICE BLDG., MIAMI, FLA. Neff-Thomas Machinery Co., 1920 N. W. Miami Court, Miami, Fla.

Fidelity Constr. Co., 460 N.W. 79 St., Miami, Fla., CA, **$500,000,** 70 addnl. RESIDENCES, in Broadmoor Manor, MIAMI, FLA. Gardner Park, Inc., c/o contractor.

Escot Constr. Co., 434 Michigan Ave., Miami Beach, Fla. Owner Builds, **$350,000,** APARTMENT bldgs., OPA LOCKA, FLA.

Trubuilt, Inc., 2401 Hargill Dr., Orlando, Fla., Owner Builds, **$320,000,** 32 RESIDENCES, ORLANDO, FLA.

Southeastern Constr. Co., 1311 Peachtree St. N.E., Atlanta, Ga., LB, **$827,535,** TB HOSPITAL, GADSDEN, ALA. District 4, State TB Sanitorium Bd., Gadsden, Ala. Bids Sept. 22. CD 9/14.

Hodgson Contg. Co., 606 Lownes St., Montgomery, Ala., CA, **$100,000** WAREHOUSE, MONTGOMERY, ALA. Hazel-Atlas Glass Co., Lower Wetumpka Rd., Montgomery, Ala.

W. K. Upchurch Constr. Co., P.O. Box 1189, Montgomery, Ala., LB, **$654,760** MUSIC, SPEECH BLDG., TUSCALOOSA, ALA. University of Alabama, Tuscaloosa, Ala. Bids Sept. 22. CD 9/4.

Lee Watson & Son, Hamilton, Miss. CA **$102,316.** WAREHOUSE-OFFICE, AMORY, MISS. Monroe County Electric Power Assn., Amory, Miss. Bids Sept. 10. CD 8/28.

Mr. & Mrs. W. L. Madden, Barnett-Madden Bldg., Jackson, Miss. Owner Builds. **$350,000.** MOTOR COURT, JACKSON, MISS.

Armco Drainage & Metal Products Co., P.O. Box 1343, Atlanta, Ga., CA **$116,615.** PLANT for Rich Industries Inc., TUPELO, MISS. Tupelo, Miss. CD 9/22, under LB.

W. Horace Williams Co., Howard Ave., New Orleans, La. and **Boh Bros. Constr. Co.,** 2400 Cypress St., New Orleans, La. CA Est. **$150,000.** PLANT addns., ARABI, LA. American Sugar Refining Co., Arabi, La.

Buquet & LeBlanc, P.O. Box 480, Baton Rouge, La. CA Est. **$350,000.** SYNAGOGUE, BATON ROUGE, LA. Congregation B'nai Israel, 1175 Nicholson Dr., Baton Rouge, La. Bids Sept. 22. CD 9/21.

L. W. Eaton Co., P.O. Box 387, Baton Rouge, La. CA Est. **$100,000.** CREAMERY addn., BATON ROUGE, LA. Louisiana Creamery, Inc., 2400 Plank Rd., Baton Rouge, La.

▲ **Nichols Constr. Co., Inc.,** 2864 Airline Hy., Baton Rouge, La. CA Total est. **$4,000,000.** mfg PLANT, BATON ROUGE, LA. Foster-Grant Co., Inc., Leominster, Mass. CD 3/23.

H. H. Lupo, Gretna, La. Owner Builds. **$300,000.** 36 RESIDENCES, GRETNA, LA.

Freeport Sulphur Co., American Bank Bldg., New Orleans, La. Owner Builds. **$150,000.** POWER PLANT and RELAY STATION, Thibodaux, NEW ORLEANS, LA.

▲ **Paducah Independent School Dist.,** Paducah, Ky. has not rejected low bid from Algernon-Blair Co., First National Bank Bldg., Montgomery, Ala. **$3,390,000,** for HIGH SCHOOL, PADUCAH, KY. At architect's request time for accepting proposal has been extended. (**Correction**-status). CD 9/16, under LB.

Orlin Edwards, 5502 Belaire Dr., Chattanooga, Tenn. Owner Builds. **$750,000.** 68 RESIDENCES, CHATTANOOGA, TENN.

Lindsey Constr. Co., Haywood Ave. and Lupton St., Chattanooga, Tenn., CA **$320,361.** NURSES RESIDENCE for Baroness Erlanger Hospital, CHATTANOOGA, TENN. City, City Hall, Chattanooga, Tenn. Bids Sept. 16. CD 9/23, under LB.

H. E. Collins Contg. Co., 1422 Cowart St., Chattanooga, Tenn., CA **$85,000.** laundry and cleaning PLANT, CHATTANOOGA, TENN. Brainerd Cleaners, Woodlawn and Brainerd Rd., Chattanooga, Tenn.

J. E. Hatfield, 1712 Union Ave., Chattanooga, Tenn. CA **$100,000.** PLANT, CHATTANOOGA, TENN. Hibler-Barnes Co., 700 E. 10 St., Chattanooga, Tenn.

Sumner Constr. Co., 912 8th Ave. S., Nashville, Tenn. CA **$679,680,** OFFICE, NASHVILLE, TENN. First Federal Savings & Loan Assn., Fourth Ave. N., Nashville, Tenn. CD 6/3/49.

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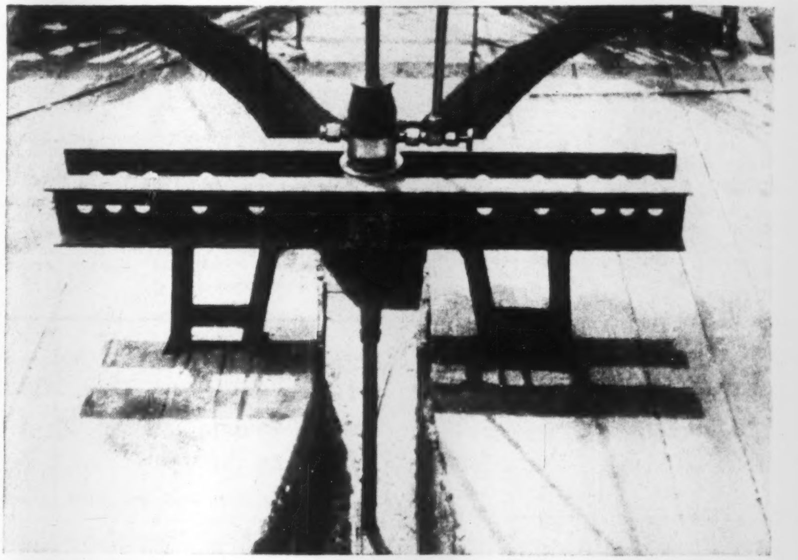

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Treatment Plant Helps Sell Home Lots at Better Prices in New Florida Subdivision

• Unique plan of private financing provides for plant operation by city of St. Petersburg on pay-for-itself basis

That a modern, efficient sewerage system and sewage treatment plant is a powerful help in selling subdivision lots is being effectively demonstrated by J. & P. Land Developers, Inc., in the promotion of "Garden Manor:" new 242-acre, 800-home tract at St. Petersburg, Florida. The sanitary system alone attracted enthusiastic buyers, and increased lot values by $450 to $500, say the developers.

Furthermore, upon completion of the development, the entire system and plant will be operated and maintained by the City of St. Petersburg on a self-supporting basis. A tax amounting to 30 per cent of the home owner's water bill is to be levied for 20 years; 60 per cent of that revenue will go to the developers to repay their $250,000 investment in the sewerage system and treatment plant; and the remaining 40 per cent will finance operation and maintenance by the city.

Main feature of Garden Manor's sewage treatment plant—complete, modern, ready to serve the new community—as a Yeomans "package" unit, combining a primary tank and digester.

As a "package" solution to a basic sanitation problem, and as an effective use of private capital, to achieve public benefits. Garden Manor offers a valuable pattern for similar developments, according to Samuel G. Johnson, Mayor of St. Petersburg; and Dr. Robert E. Rothermel, Director of Public Health of Pinellas County, praises the whole project as a wholesome example of "intelligent co-operation by public officials and commercial developers."

If you are interested in taking small-community sewage treatment out of the "necessary evil" class and making it a profit producer, write for information of Yeomans "Packaged" Sewage Treatment Plants.

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These stories, and others, are told in full in our periodical, *The Yeomans Guard.* It's full of news and useful information about the pumping of materials and the treatment of wastes, both domestic and industrial. A copy of the current issue is yours for the asking. Contact your local Yeomans Representative—listed in the telephone book yellow pages under "Pumps"—or write direct.

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MIDDLE WEST

BIDS ASKED—HEAVY CONSTRUCTION

Wis., Madison—GREENHOUSE—B.A. 10/29—University of Wisconsin, Madison, greenhouse. Plans deposit $25. Weiler & Strang, 114 N. Carroll St., engrs.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

OHIO—State Hy. Dpt., Columbus,
Penetryn System, Inc., Railroad Ave. (P.O.B. 5052), Albany, N. Y., LB **$738,760**, est. $722,400, Type T-50 and structure 0.326 mi. USR 62-17.74, F-524 (6), Mahoning Co. Bids Sept. 22. CD 9/2.

▲ **OHIO**—State Hy. Dpt., Columbus,
John Hill Contg. Co., 491 Lexington Ave., Mansfield, O., LB **$63,295**, est. $76,200, Type T 35 and structure 0.113 mi. SR 734-5.10, S-1144 (1), Village of Jeffersonville, Fayette Co.;

The Ohio Engineering Co., 105 Sixth St., Lorain, O. LB **$134,363**, est. $143,170. Type T-35, 1.358 mi. CR 1, S-406 (3), Village of Amherst, Lorain Co.;

The Red Eagle Corp., 176 Walhalla Rd., Columbus, O., LB **$349,099**, est. $384,100, Type T-35, 4.806 mi. SR 104-(15.46-18.34), (19.02), (22.31), S-79 (3), S-79 (4), Ross Co.;

Pinckney P. Brewer & Sons Co., 7455 Dawson Rd., Madeira, O., LB **$93,751**, est. $96,150, Type T 35, 3.277 mi. USR 52-13.45, Brown Co.;

W. P. McCarren Co., Walhonding, O., LB **$78,564**, est. $96,880, Type T 35, 1.062 mi. USR 36-23.92, Coshocton Co.;

Encrete, Inc., 3360 W. Dorothy Lane, Dayton, O., LB **$67,576**, est. $75,600, Type T 35 on B-119 and structure 0.421 mi. SR 247-11.00, Highland Co.;

The Clinton Asphalt Paving Co., 135 N. South St., Wilmington, O., LB **$86,733**, est. $75,700, Type T-35, 0.818 mi. USR 22-(10.78-11.03), Warren Co.;

cancelled bids to have been opened Sept. 22, Type B-119, 4.721 mi. CR 28, S-386 (2), Pike Co.;

received no bids Sept. 22, Type T-35, 1.202 mi. USR 224-(20.27-20.47) Medina Co. Bids Sept. 22. CD 9/2.

McNamara, Inc., 511 N. Waverly Rd., Lansing, Mich. CA **$84,325**. 8- to 21-in. vitr. sanitary sewers, siphon under Huron River, ANN ARBOR, MICH. City, Fred A. Looker, clk., Ann Arbor, Mich. Bids Aug. 26. CD 8/7.

BUILDINGS

LOW BIDS AND CONTRACTS

W. L. Bridges Constr. Co., 239 N. Delaware St., Indianapolis, 5, Ind. Owner Builds. **$350,000.** HOMES in Sylvan States, Section 3, INDIANAPOLIS, IND.

Durabilt Homes, Inc., 4726 Longworth St., Indianapolis, Ind. Owner Builds. **$500,000.** 50 HOMES in Lawrence Manor, INDIANAPOLIS, IND.

A. H. Graves, Inc., 5849 College Ave., Indianapolis, Ind. Owner Builds. **$350,000.** 30 HOMES in Brockton addn., INDIANAPOLIS, IND.

Algot B. Larson, 3837 W. Lake St., Chicago, Ill., CA, **$350,000** HOME for Aged, 2833 Nordica St., CHICAGO, ILL. Bethesda Home for Aged, 2833 Nordica St., Chicago, Ill. Naess & Murphy, 80 E. Jackson Blvd., Chicago, Zone 4, archts. Awarded Sept. 21.

▲ **Power Constr. Co.**, 212 S. Marion St., Oak Park, Ill., CA, **$1,314,374**, York Community High SCHOOL, ELMHURST, ILL. School District No. 88, 355 W. St. Charles Rd., Elmhurst, Ill. Bids Sept. 3, awarded Sept. 22. CD 9/22, under LB.

Reibman Constr. Co., 1243 S. Wabash St., Chicago, 5, Ill., CA, **$160,000**, 1 story, steel SHOP and WAREHOUSE, EVANSTON, ILL. Interstate Steel Co., 2100 Greenwood St., Evanston, Ill. Barancik & Conte, 919 N. Michigan Ave., Chicago 11, Ill., archts. Awarded Sept. 23.

Sherman Olson Co., 219 N. Kilpatrick Ave., Chicago, Ill., CA, **$350,000**, 1 story, 50,000 sq. ft. FACTORY addn. MORTON GROVE, ILL. Crane Packing Co., 6500 Oakton Ave., Morton Grove, Ill. Olsen & Urbain, 5 S. Wabash Ave., Chicago, 3, Ill., archts. Awarded Sept. 25.

Kim Builders, 700 S. Sequin St., Mount Prospect, Ill. Owner Builds. **$350,000.** 25 HOMES, northwest of MOUNT PROSPECT, ILL.

WEST OF MISSISSIPPI

BIDS ASKED—HEAVY CONSTRUCTION

† **MONTANA**—B.A. 10/13—Bureau P. Rds., Dpt. Commerce, Morgan Bldg., Portland, Ore.,
Glacier Co.—asph. surf. 12.584 mi. Many Glacier Rd. and approach Proj. 3-A1, B1 and 13, W. H. Lynch, div. engr.

Nebraska—RURAL DISTRIBUTION LINES—B.A. 10/14 Niobrara Valley Electric Membership Corp., O'Neill, approx. 20.8 mi. 69 KV line, 5.13 mi. 34.5 KV line and 1.83 mi. 7.2/12.5 KV underbuild, Holt and Boyd Counties. Plans deposit $10. Philip L. Burns, 630 Davenport Bank Bldg., Davenport, Ia., consult. engrs. CD 4/5/49.

Minn., New Ulm—B.A. 10/15—Brown Co., C. E. Schmid, aud., constr. County Ditch No. 10, 8,150 ft. 6- to 15-in. drain tile. Bids 9/3 rejected. CD 8/19.

† **Neb., Fort Crook**—UTILITIES, etc.—B.A. 10/15—U. S. Eng., 1709 Jackson St., Omaha, utilities extens. and rehabilitation at Offutt Air Force Base, Inv. 25-066-54-28. CD 4/29/52.

Okla., Marlow—B.A. 10/15—City, sewage disposal plant addn. $80,000. V. V. Long & Co., Colcord Bldg., Oklahoma City, engrs.

† **Tex., Marshall**—B.A. 10/15—U. S. Eng., Box 61, Tulsa 2, Okla., roads and concrete pavement, ENG-34-066-54-22. $500,000. Extended date. CD 9/25.

MINNESOTA—B.A. 10/16—State Hy. Dpt., 1246 University Ave., St. Paul,

St. Paul—constr. Bridge No. 5660, $60,000, M. O. Giertsen, bridge engr.

MINNESOTA—B.A. 10/16—State Hy. Dpt., 1246 University Ave., St. Paul,

grading, crushed rock or soil-cement base and plant mixed bit. surf. 10 mi. between Kenyon and West Concord, S.P. 2006-08 (T.H. 56-56), S.P. 2006-609 (T.H. 56-56) and S.P. 2507-07 (T.H. 56-56), Plans deposit $2.70. over $60,000.

grading 0.2 mi. near Lindstrom, S.P. 4301-15 (T.H. 8-46), under $60,000.

grading 5.2 mi. between Round Lake and Jct. T.H. 16 S.P. 5310-02 (T.H. 264-264), Plans deposit 80c.

grading 7.6 mi. between Jct. T.H. 107 near Brook Park and Jct. T.H. 61 near Mission Creek, S.P. 5801-05 (T.H. 23-23), Plans deposit $2.10.

grading 10.5 mi. between T.H. 13 and 0.8 mi. east of Ellendale, S.P. 7403-11 (T.H. 30-82) and S.P. 8106-02 (T.H. 30-82), Plans deposit $2.70, all foregoing over $60,000 each. O. L. Kipp, ch. engr.

Minn., Granite Falls—B.A. 10/16—Yellow Medicine Co., G. L. Swanson, aud., constr. Lateral D of County Ditch No. 1B, 1½ mi. southwest of Echo, 26,281 ft. open ditch, 163,692 cu. yd., 650 ft. roadway, 835 cu. yd., 256 ft. 48- to 66-in. S. C., 34 ft. 4x3 ft. CM 12, 34 16 ft. CM 16, 50 ft. 10 in. drain tile and 1 tile inlet, 153 ft. 10 to 15 in. CM 16, 17,109 ft. 8- to 14-in. drain tile ave. dept 5.2 ft. to 6.6 ft., 30 tile inlets, $44,574, Ted L. Chamberlain, Montevideo, engr.

† **Minn., Minneapolis**—B.A. 10/16—U. S. Eng., 1709 Jackson St., Omaha, Neb., addnl. force main and gravity sewers TCA, Inv. 25-066-54-7.

OKLAHOMA and TEXAS—B.A. 10/20—State Hy. Dpt., Capitol, Oklahoma City, Okla. and State Hy. Comn., Austin, Tex.

McCurtain Co., Okla.—bridge over Red River, near Idabel, Okla. $665,000. G. H. Bittle, c/o Okla. State Hy. Dpt., engr. CD 7/19/51.

† **North Dakota and South Dakota**—TOWERS—B.A. 10/27—Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars shipping point or for purposes of bidding f.o.b. cars Valley City, N. D., galvanized steel single-circuit towers for Jamestown-Fargo 230-kilovolt transmission line and Watertown and Granite Falls sub-stations, Transmission Div., Missouri River Basin Proj. Inv. No. DS-4053.

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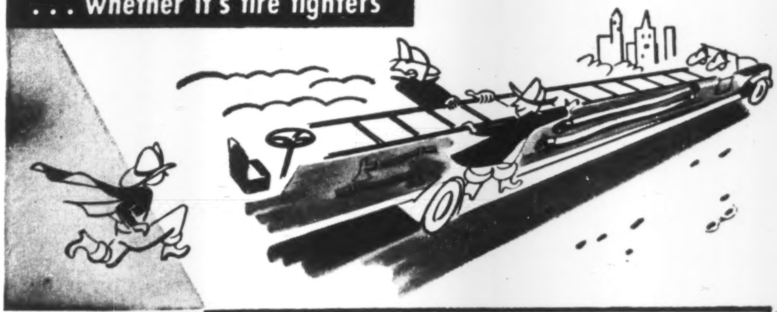
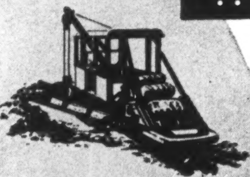


. . . or digging equipment



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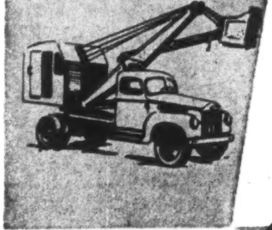

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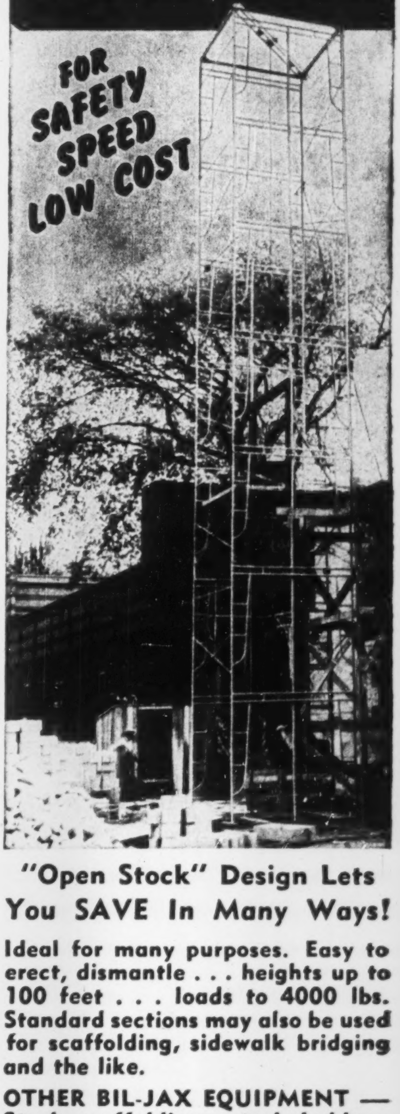

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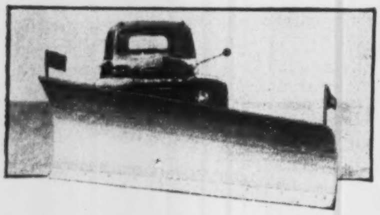

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† **Tex., Kingsville** TAXIWAY—B.A. 10/27—U. S. Govt., c/o Officer in Charge Constr., Admin. Bldg. 1, Naval Air Station, Corpus Christi, connecting taxiway "C-X" between North and South Fields, incl. 2 flexible base, hot mix b. conc. surfaced taxiways, 75x5,650 ft. and 40x500 ft. patrol roads, appurtenances Naval Auxiliary Air Station, Spec. No. 33469. $250,000-$750,000. Plans deposit $20. Extended date. CD 9/23.

† **Tex., Laredo**—HOSPITAL—B.A. About 11/13—U. S. Eng. P. O. Box 1229, Galveston, 1 story, wood frame, approx. 44,986 sq. ft. 50-bed hospital, Laredo Air Force Base, Inv. No. ENG-41-243-54-22. $500,000-$1,000,000. CD 11/28.

† **North Dakota**—TRANSMISSION LINE—B.A. after 12/23—Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver, Colo., constr. about 84 mi. Jamestown-Fargo 230 kilovolt transmission line, Transmission Div., Missouri-Souris Dist., Missouri River Basin Proj.

BIDS ASKED—BUILDINGS

Tex., Nacogdoches—HOTEL—B.A. 10/20—Nacogdoches Hotel Corp., Nacogdoches, 5 story hotel, Hospital and Fredonia Sts. $800,000. Extended date. Edward B. Tucker, Box 946, Nacogdoches (consult.) J. N. McCammon, Reserve Loan Life Bldg., Dallas and Carlos Schoeppl, 2701 Biscayne Blvd., Miami, Fla. (consult.), archts. CD 9/23.

▲ **Tex., Gladewater**—SCHOOL—B.A. 10/22—Gladewater Independent School Dist., c/o Dana Williams, supt., Gladewater elementary school and Negro High School, masonry, concrete asph. tile. $1,000,000. Plans deposit $25. Preston M. Geren, 1607 Fort Worth Natl. Bldg., Fort Worth, archt. CD 7/21.

Tex., Lampasas—ARMORY—B.A. 10/26—State Bd. Control and Texas National Guard, Camp Mabry, Austin, rein.-con. frame and fdn., brick exterior armory. $100,000. Plans deposit $15. P. G. Norton, Bryan, archt.

Tex., Waco—HIGH SCHOOL, etc.—B.A. 10/27—St. Mary's Catholic Church of the Assumption, 1401 Washington Ave., Parochial Junior-Senior High School bldg. and sisters home. $500,000. Walter Cocke Jr. & Co., Waco, archts. Frank T. Drought, 117 W. Pecan St., San Antonio, engr. CD 8/26.

Minn., Gibbon—SCHOOL—B.A. 10/29—Bd. Educ., R. Klukas, clk., 2 story, 77x161 ft. school addn., alterations. $300,000. Plans deposit $30, H. H. Swanson, 500 Sexton Bldg., Minneapolis, archt. CD 6/3.

SOON LETS CONTRACT—BUILDINGS

Okla., Oklahoma City—WAREHOUSE, etc.—Merchants Biscuit Co., 30 and Taylor Sts., Omaha, Neb., soon lets contract warehouse and office, 44 and Cooper Sts. $150,000. J. T. Allan, 224 Brandeis Theatre, Omaha, Neb., archt.

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HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

MINNESOTA—State Hy. Dpt., 1246 University Ave., St. Paul,

Brogan Constr. Co., 321 Locust St., Des Moines, Ia. CA **$90,510.** Bridge No. 6802 over Sand Creek at Jordan, Scott Co. Bids Sept. 4. CD 8/19.

▲ **MINNESOTA**—State Hy. Dpt., 1246 University Ave., St. Paul,

H. Ganley, Inc., 2336 Hampden Ave., St. Paul, Minn. LB **$647,028.** grav. base, plant-mixed bit. surf. 11.4 mi. between Hamel and Thomas Ave. North in Minneapolis, Hennepin Co.;

Jeffries Constr. Co., Mankato, Minn. LB **$570,604.** grading 9.1 mi. between 0.8 mi. southwest of Belle Plaine and 0.5 mi. northeast of west limits of Jordan, Scott Co. Bids Sept. 25. CD 9/10.

P. Zimmerman, Olivia, Minn., CA **$35,111.** open ditch County Ditch No. 10, NEW ULM, MINN. Brown Co., C. E. Schmid, aud., New Ulm, Minn. Bids Sept. 3. CD 8/19.

Sandstrom & Hafner, 740 E. Superior St., Duluth, Minn. CA **$278,882.** sanitary sewers, NORTH ST. PAUL, MINN. Village, G. E. Olson, mgr., North St. Paul, Minn. Bids Sept. 23. CD 8/31.

R. V. Leary Co., 937 5 St., Des Moines, Ia., CA, **$127,565,** light and power extensions, GOWRIE, IA. City, Municipal Electric Light & Power Co., Gowrie, Ia. R. W. Gearhart, 349 21 St. S.E., Cedar Rapids, Ia., engr.

City, E. Machart, aud., Grafton, N. D. rejected bids Sept. 9, water reservoir and treatment plant and distr. sys., GRAFTON, N. D. LB **$889,676.** CD 9/22, under LB.

NEBRASKA—State Dpt. Roads & Irrigation, Lincoln,

Theisen Bros., Osmond, Neb., LB **$70,361,** grading and pavement, S-475, Norfolk-Hoskins, Madison Co. Bids Sept. 24. CD 9/16.

Peter Kiewit Sons Co., Omaha Natl. Bank Bldg., Omaha, Neb., CA **$70,000,** paving and storm sewers, MILLARD, NEB. City, Millard, Neb. Backlund & Jackson, 4924 Poppleton Ave., Omaha, Neb., engrs. Bids Aug. 17.

KANSAS—State Hy. Comn., State House, Topeka,

List & Weatherly Constr. Co., 231 W. 47 St., Kansas City, Mo. CA **$293,230.** Bridge 40-89-19.9 Sta. 98 plus 38.5 substructure Kansas River Bridge (2 abutments and 11 piers) Proj. 40-89 ER 68, Shawnee Co.

Pittsburgh-Des Moines Steel Co., 1015 Tuttle St., Des Moines, Ia. CA **$505,265.** Bridge 40-89-19.9 Sta. 98 plus 38.5 superstructure Kansas River Bridge (1,761 ft. 9 in.) 2 steel beam spans, 5-deck truss spans, 5-deck plate girder spans, Proj. 40-89 ER 68, Shawnee Co. Bids Sept. 22. CD 8/26.

Imperial Paving Co., 700 E. Grand St., Oklahoma City 4, Okla., CA **$104,460,** est. $110,000, resurface S. E. 59 St. from Shields Blvd. to Midwest City, OKLAHOMA CITY, OKLA. Oklahoma Co., Court House, Oklahoma City, Okla. Art Marvel, c/o owner, engr. Awarded Sept. 15. CD 4/11/52.

Hill Country Telephone Co-operative, Fredericksburg, Tex. Force Account. **$125,000,** some rural pole telephone lines, Kerrville, Kerr Co.; **$100,000,** some rural pole telephone lines, Fredricksburg; **$95,500,** some rural pole telephone lines, Mason, Mason Co., TEXAS. Grand total $320,500. CD 7/9/48.

City, Baytown, Tex., Own Forces. **$75,000,** some c.i. water distr. lines, BAYTOWN, TEX. C. W. Grantham, Baytown, Tex., city engr. Joe J. Rady, Insurance Bldg., Fort Worth, Tex., engr.

City, Baytown, Tex. Own Forces. **$70,000,** street grading, drainage, some asph. surf., BAYTOWN, TEX. C. W. Grantham, Baytown, Tex., city engr. CD 5/3/51.

City, Clute, Tex., Purchases, Day Labor. **$42,150,** developing small earthen and concrete reservoir, dam for water supply storage; **$38,000,** rein.-con. ground water storage reservoir; **$65,000,** some water mains, CLUTE, TEX. Grand total $145,150. CD 1/7.

City, Columbus, Tex., Own Forces. **$60,000,** street imprvs., grading, drainage, excavating, surfacing, COLUMBUS, TEX. R. E. Schiller, Columbus, Tex., engr.

City, Columbus, Tex. Own Forces. **$35,000,** water lines, COLUMBUS, TEX. R. E. Schiller, Columbus, Tex., engr.

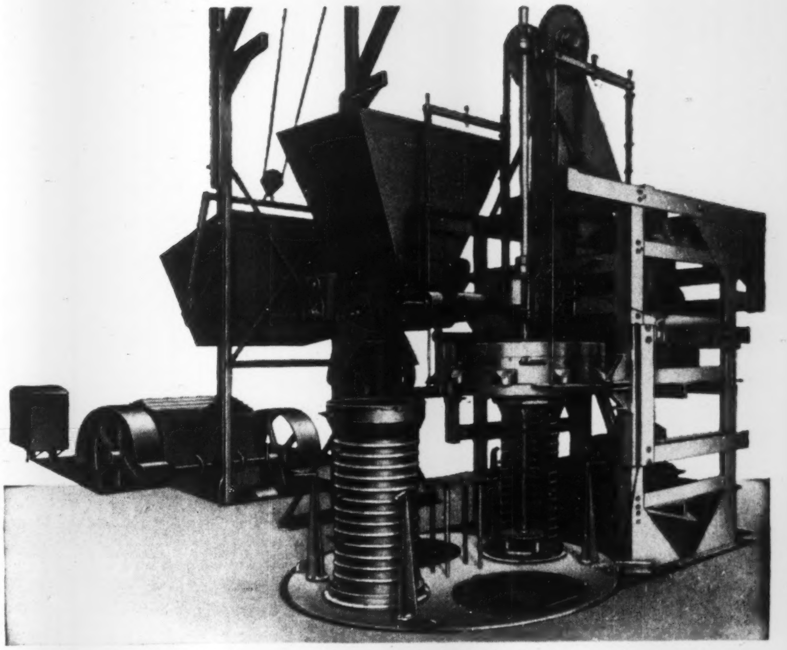
Whittle Constr. Co., 4007 Irving Blvd., Dallas, Tex. LB **$229,000,** elevated steel water storage tank, Garland Rd. and N.W. Hy., DALLAS, TEX. City, City Hall, Main and Harwood Sts., Dallas, Tex. Bids Sept. 21. CD 9/8.

Ray Goodson, Mexia, Tex., LB **$36,918,** 2 pumping station units (elevated), concrete fdn. for tank, GOLIAD, TEX. City, Goliad, Tex. Bids Sept. 24. CD 9/10.

Roy Goodson, Mexia, Tex., LB **$63,150,** est. $65,000, sewage disposal plant addns., GOLIAD, TEX. City, Goliad, Tex. Bids Sept. 24. CD 9/17.

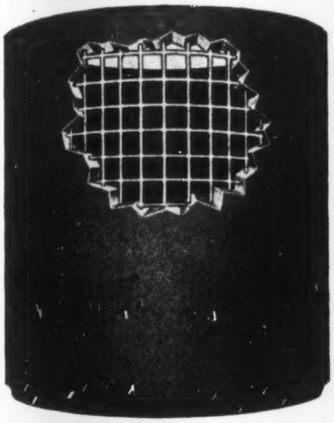
▲† **Lawless & Alford, Inc.**, Box 600, Austin, Tex. CA **$1,285,612,** est. $1,000,000-$3,000,000, relocating 20 barracks bldgs., new 2 story dormitories, messes, chapel, etc. Harlingen Air Force Base, Inv. No. Eng 41-243-53-116, HARLINGEN, TEX. U. S. Eng., Box 1229, Galveston, Tex. Bids Sept. 22. CD 9/28, under LB.

† **Arthur Bros., Inc.**, Box 312, Kingsville, Tex., LB **$377,853,** recreation bldg., Naval Auxiliary Station, NOY 76721, KINGSVILLE, TEX. U. S. Govt., Navy Dpt. Officer in Charge Constr., Admin. Bldg. 1, Naval Air Station, Corpus Christi, Tex. Bids Sept. 24. CD 9/15.



McCracken "T" Concrete Pipe Machine

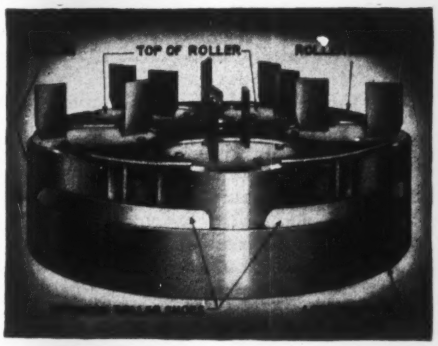
Doubles production of 4" to 36" Pipe



36" Pipe with eliptical steel cage—saves ½ the steel.

Here's the one Machine on the market today that can handle *all* your production from 4" to 24" Bell and Spigot Sewer Pipe (plain) and from 12" to 36" Tongue and Groove Culvert Pipe (reinforced). In footage this range of sizes is 80% of the market.

These are the *small sizes* in which *machine-made* production and its resulting economies are essential to compete. This Model "T" Machine offers important *savings* ranging from 50% on the smaller down to 10% on the larger sizes. It doubles production—needs no Pallets and saves extra handling of B&S Pipe—permits handling double the business with half the inventory.



ONE 8-HOUR SHIFT PRODUCES:

PLAIN PIPE	SIZE OF PIPE	REINFORCED PIPE
2400 feet	4" to 12"	- - - -
1750 feet	12" to 18"	1600 feet
1200 feet	21" to 24"	1100 feet
- - - -	30" to 36"	900 feet

Exclusive Roller-Head, used in sizes 12" to 36", packs the 4" wall of 36" pipe like a Packer-Head packs the 1" wall of 10" pipe.

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CONCRETE PIPE MACHINERY CO.

10 GEORGE STREET • SIOUX CITY 17, IOWA

McCRACKEN PIPE Corrugated

City, Midland, Tex., Purchase and Hire. **$80,000,** some WW sys. rehabilitation work, MIDLAND, TEX. Joe E. Ward, 545 Nacol Bldg., Wichita Falls, engr. Wm. B. Nealey, Midland, Tex., city engr. Bids Aug. 24.

City, Midland, Tex. Purchase and Hire. **$90,000,** some rehabilitation work to sanitary sewerage sys. MIDLAND, TEX.

Estates Development Co. of Pasadena, Pasadena, Tex. Own Forces. **$48,885,** water sys., PASADENA, TEX.

Estates Development Co. of Pasadena, Pasadena, Tex. Own Forces. **$78,000,** some concrete paved streets, concrete curbs and gutters, sidewalks, PASADENA, TEX.

Estates Development Co. of Pasadena, Pasadena, Tex. Own Forces. **$60,000,** area lighting sys. (to hook on to CP & LC sys.), PASADENA, TEX.

City, Port Arthur, Tex. Purchase and Hire. **$95,500,** some 15 in. concrete and box type storm sewers, PORT ARTHUR, TEX. Smith & Norton, Harris Bldg., Port Arthur, Tex., engrs. CD 12/12/50.

City, Port Arthur, Tex. Purchase and Hire. **$100,000,** some residential street paving, 6 in. stabil. base 1½ in. hot mix topping, PORT ARTHUR, TEX. Smith & Norton, Harris Bldg., Port Arthur, Tex., engrs. CD 12/12/50.

City, Stinnett, Tex. Own Forces. **$35,000,** water lines, some existing sys. rehabilitation work, STINNETT, TEX.

City, Stinnett, Tex. Own Forces. **$65,000,** sanitary sewers, STINNETT, TEX.

City, Stinnett, Tex. Own Forces. **$60,000,** natural gas distr. sys. STINNETT, TEX.

Town, Texas City, Tex., Force Account. **$79,500,** sanitary sewer interceptor, TEXAS CITY, TEX. Robert Osborn, Texas City, Tex., city engr. Joe J. Rady, Insurance Bldg., Fort Worth, Tex., engr. CD 8/5.

Town, Texas City, Tex. Force Account. **$85,000,** some addnl. street asph. type paving, concrete curbs and gutters, TEXAS CITY, TEX. Robert Osborn, Texas City, Tex., city engr. Joe J. Rady, Insurance Bldg., Fort Worth, Tex., engr. CD 8/5.

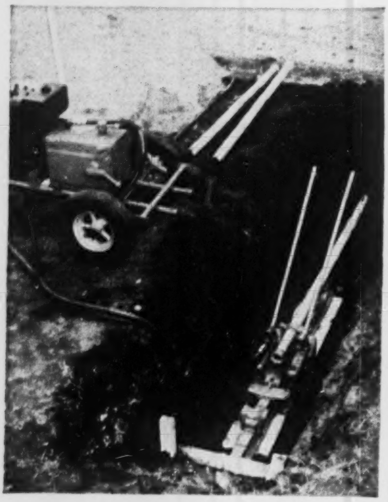
V. Clause, 3802 Whittier St., Abilene, Tex., LB **$76,180,** water distr. sys., VIDOR, TEX. Orange County Water Control & Imprvt. Dist. No. 1, Vidor, Tex. Koch & Fowler, 3900 Lemmon St., Dallas, Tex., engrs. Bids Sept. 22.

V. Clause, 3802 Whittier St., Abilene, Tex., LB **$131,064,** sanitary sewer collection sys.;

Clyde Smith, Box 791, Austin, Tex., LB **$68,952,** sewage treatment plant; LB **$62,215,** lift station, VIDOR, TEX. Orange Co. Water Control & Imprvt. Dist. No. 1, Vidor, Tex. Koch & Fowler, 3900 Lemmon St., Dallas, Tex., engrs. Bids Sept. 22.

† **Shawnee Asphalt Co.,** 30 and Council Sts., Oklahoma City, Okla., LB **$117,493,** est. $120,000, addnl.

FAST, EASY WAY TO INSTALL PIPE... AT LOWER COST



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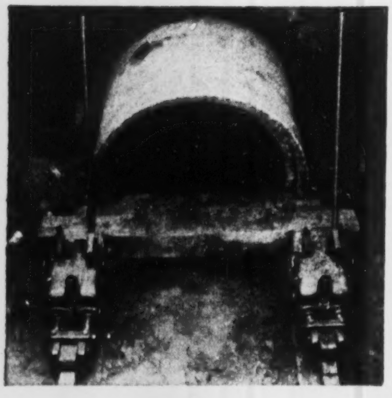

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parking areas, ENG-34-066-54-4, WICHITA FALLS, TEX. U. S. Eng., Box 61, Tulsa 2, Okla. Bids Sept. 24.

BUILDINGS

LOW BIDS AND CONTRACTS

Merchants Fast Motor Lines, 442 Locust St., Abilene, Tex. Owner Builds. **$200,000,** TRUCK TERMINAL, ABILENE, TEX. CD 9/28.

O'Rourke Constr. Co., Box 7557, Houston, Tex., LB **$208,700.** FREIGHT TERMINAL, BEAUMONT, TEX. Central Freight Lines, Box 236, Waco, Tex. Bids Sept. 9. CD 9/8.

Telelpsen Constr. Co., Box 74, Houston, Tex., CA **$500,000.** WAREHOUSE and wharf, FREEPORT, TEX. Dow Chemical Co., Freeport, Tex. Bids June 27. CD 6/24.

S. R. & J. S. Zuber & Son and Assoc., 1330 Castle St., Houston, Tex. Own Forces. **$350,000,** 12 one and two story brick, stone DWELLINGS; **$300,000,** 10 brick and stone exterior dwellings, concrete slab fdn. HOUSTON, TEX. CD 8/21.

Schneider Constr. Co., 3004 W. Dallas St., Houston, Tex., CA **$316,175,** MOTOR BANK, HOUSTON, TEX. Houston National Bank, 202 Main St., Houston, Tex. CD 9/24.

Sharp Constr. Co., 2202 Rosslyn St., Houston, Tex. CA **$368,500,** 35 DWELLINGS, HOUSTON, TEX. Frank W. Sharp, 2202 Rosslyn St., Houston, Tex.

Monroe Shakno, 1014 Earle St., Houston, Tex. CA **$300,-000.** 3 APARTMENTS, HOUSTON, TEX. Albert & Harold Farb, 901 Commerce St., Houston, Tex. CD 9/24.

▲ **Lufkin Constr. Co.,** Box 717, Lufkin, Tex., CA **$1,-088,744.** Senior HIGH SCHOOL, LUFKIN, TEX. Lufkin Independent School Dist., Lufkin, Tex. Bids Sept. 18, awarded Sept. 25. CD 9/25, under LB.

† **King Constr. Co.,** Box 39, Texarkana, Tex. LB **$203,-498,** est. $100,000. CHARGE BLDG., X-RAY BLDG., etc. for Lone Star Ordnance Plant, Area "B", Inv. No. Eng 34-066-54-16, TEXARKANA, TEX. U. S. Eng., **Box 61, Tulsa 2, Okla. Bids Sept. 24. CD 9/17.**

FAR WEST

BIDS ASKED—HEAVY CONSTRUCTION

† **Wash., Spokane**—WAREHOUSE—B.A. 10/21—U. S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, alter Warehouse 2447 at Fairchild Air Force Base, ENG-45-108-54-56. CD 9/18/51.

BIDS ASKED—BUILDINGS

Calif., Talmage—WARD—B.A. 10/20—State Div. Architecture, P. Wks. Bldg., Sacramento, 2 story rein.-con. ward bldg. at Mendocino State Hospital. CD 3/5/45, under California.

Wash., Seattle—SCHOOL—B.A. 10/20—School District No. 1, 814 4 Ave. N., three 1 story, steel frame, 35,000 sq. ft. West Seattle High School addns. and altering existing bldg. $500,000. Plans deposit $50. Naramore, Bain, Brady & Johanson, 904 7 Ave., archts. CD 9/28.

SOON LETS CONTRACT—BUILDINGS

▲ **Wash., Walla Walla**—DORMITORY—Whitman College, Walla Walla, soon lets contract 3 story, bsmnt., 10,000 sq. ft., rein.-con. women's dormitory. $1,000,-000. H. E. Crawford, 1324 Isaacs Ave., archt. CD 6/4/45.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **Ben Fallgren,** 127 S. Alvarado St., Los Angeles, Calif., LB **$123,165,** automotive maintenance shop, etc. Nellis Air Force Base, ENG-53-160, LAS VEGAS, NEV. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Sept. 22. CD 9/8.

WASHINGTON—State Hy. Comn., Olympia,
Sather & Sons, Yardley, Wash., CA, **$580,956,** b. conc. paving, and rein.-con. undercrossing for Pasco approaches to Columbia River Bridge 4.65 mi. Hy. 3, Franklin Co. Bids Sept. 22. CD 9/28, under LB.

Washington—STORAGE BUILDINGS—State Hy. Comn., Olympia, rejected bids Sept. 22, maintenance storage buildings, Lincoln, Stevens, Pende Oreille, and Spokane Counties. LB **$136,882.** CD 9/10.

Harold Kaeser Co., 2929 E. 133 St., Seattle, Wash., LB, **$72,205,** est. $76,000, 8,730 ft. sewers in Local Imprvt. Dist. No. 6 in Forest Park and View Ridge Addn. No. 3, EVERETT, WASH. City, City Hall, Everett, Wash. Bids Sept. 25. CD 9/17.

Harbor Constr. Co., 309 1 Ave. W., Seattle, Wash., LB, **$85,032,** 16,795 ft. 4- to 8-in. water mains for $150,000 water sys., FORKS, WASH. Town, Town Hall, Forks, Wash. Bids Sept. 24. CD 9/16.

† **Cisco Constr. Co.,** Builders Exchange Bldg., Portland, Ore., LB, **$497,000,** est. $750,000, 19,578 ft. 230-kv transmission line and 2 sub-stations at Hanford Works, RICHLAND, WASH. Atomic Energy Comn., Richland, Wash. Bids Sept. 22. CD 9/2.

† **U. S. Eng.,** City-County Airport, Walla Walla, Wash. rejected bids Aug. 27, dredging Lower Navigation Lock Approach, McNary Dam, CIVENG-45-164-54-4. OREGON. LB **$39,500.** CD 9/3, under LB.

CALIFORNIA—State Div. Hys., P. Wks. Bldg., Sacramento,
Griffith Co., 1060 S. Broadway, Los Angeles, Calif., LB, **$112,405,** grading, surf. 6.1 mi. Stockdale Rd. between Oak St. and Allen Rd., Kern Co.;
Claude C. Wood Co., P.O. Box 599, Lodi, Calif., LB, **$139,964,** grading, surf., arch culvert, etc. 1.1 mi. at Big Gulch near Pt. Arena, Mendocino Co.;
Granite Constr. Co., P.O. Box 900, Watsonville, Calif., LB **$499,353,** grading, paving 3.8 mi. between Gonzales and Chualar, Monterey Co.;
Thomas Constr. Co., P.O. Box 683, Fresno, Calif., LB **$183,465,** grading, surf. 1 mi. Ash Ave., Tulare Co. Bids Sept. 23. CD 9/2.

E. T. Haas, P.O. Box 85, Belmont, Calif., LB, **$171,-150,** pipe line and water sys., CASTROVILLE, CALIF. Castroville County Water Dist., P.O. Box 33, Castroville, Calif. Bids Sept. 24. CD 8/27.

▲ **H. B. Nicholson, James L. Ferry & N. P. Van Valkenburg,** 880 E. Colorado St., Pasadena, Calif., LB, **$3,-149,430** constr. 5 steel plate pump delivery pipe lines on Colorado River Aqueduct, San Bernardino and Riverside Counties, LOS ANGELES, CALIF. Metropolitan Water Dist. of Southern California, 306 W. 3 St., Los Angeles, Calif. Bids Sept. 24. CD 9/4.

▲ **Vinnell Co., Inc.,** 1145 Westminster Ave., Alhambra, Calif. LB **$2,067,298,** constr. Section 1, La Cienega and San Fernando Valley Relief Sewer, Unit "A" LOS ANGELES, Calif. City, City Hall, Los Angeles, Calif. CD 10/1/52.

BUILDINGS

LOW BIDS AND CONTRACTS

Pete Buorkland, E. 1311 11 St., Spokane, Wash., LB **$331,641,** elementary SCHOOL, POTLATCH, IDAHO. School District 285, Potlatch, Idaho. Bishop, Wulff & Ritter, W. 1526 Riverside St., Spokane, Wash., archts.

W. G. Clark Co., 408 Aurora Ave., Seattle, Wash., LB, **$167,747,** 1 story, rein.-con. chemical mfg. PLANT and WAREHOUSE, SEATTLE, WASH. Clorax Chemical Co., 850 42 Ave., Oakland, Calif. Bids Sept. 23. CD 9/16.

▲ **P. J. Walker Co.,** 714 W. Olympic Bld., Los Angeles, Calif., LB, **$1,047,000,** complete job;
McDonald Bros., 7014 W. Adams Blvd., Los Angeles, Calif. LB, **$744,979** general bid, JUVENILE UNIT at Camarillo State Hospital, CAMARILLO, CALIF. State Div. Architecture, 110 S. Grand Ave., Los Angeles, Calif. Bids Sept. 23. CD 8/27.

▲ **Clayton Valley Builders,** 3397 El Monte St., Concord, Calif. Own Forces, **$10,000,000,** HOUSING DEVELOPMENT and SHOPPING CENTER in Canterbury Village, CONCORD, CALIF.

CANADA

BIDS ASKED—BUILDINGS

N. S. Halifax — INDUSTRIAL — B.A. 10/20 — Defence Constr. Ltd., 1032 Gottingen St., 3 industrial buildings on Seaward Defence site, $800,000. Plans deposit $100. C. J. Connolly, c/o owner, engr.

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Low-cost
WAREHOUSE
USING
MONOCORD
TRUSSES

Going up for Cook and Kier Lumber Company of Lockland, Ohio, are nine 92'-6" Monocord Timber Trusses fabricated by Weyerhaeuser, for a lumber shed, 128' long.

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HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **Construction Aggregates Corp.**, 33 N. La Salle St., Chicago, Ill., SA Est. over **$25,000,000** dredging at iron mine, Steep Rock Lake, ONTARIO. Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill. CD 2/25, under Industrial Buildings.

Terminal Constr. Co., Ltd., Dominion Square Bldg., Montreal, Que., CA, **$600,000**, central heating plant and relative work at R.C.A.F. Station, Field 122-20-A1-2, ANGUS, ONT. Defence Constr. Ltd., 56 Lyon St., Ottawa, Ont. Bids Aug. 26. CD 8/14.

BUILDINGS

LOW BIDS AND CONTRACTS

James Kemp Constr. Co., 121 Vansitmart St., Hamilton, Ont. CA, **$350,000** CHURCH, HAMILTON, ONT. Parish of St. Anthony of Padua, Barton St. E., Hamilton, Ont. Bids Sept. 15. CD 8/28.

R. E. Stewart Constr. Corp., 826 Wellington St. S., Sherbrooke, Que., CA, **$200,000**, 1 story, 110x400 ft., rein.-con., steel, brick, block PAPER PLANT addn., WINDSOR MILLS, QUE. Canada Paper Co., 407 McGill St., Montreal, Que. J. A. Bardsley, c/o owner, engr. CD 8/31/51.

I. Farber, 545 St. Roch St., Montreal, Que., Owner Builds, **$300,000**, 24 HOUSES in housing development on Hogue Ave. between Fleury and Prieur Sts., QUEBEC CITY, QUE.

ALASKA

BIDS ASKED—BUILDINGS

† **Alaska, Big Delta**—STORAGE MAGAZINES—B.A. 10/27—U. S. Eng., Anchorage, two 26x40 ft. and seven 26x60 ft. rein.-con. underground ammo storage magazines, Inv. 54-23. Plans deposit $20. CD 11/26.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **U. S. Eng.**, Anchorage, Alaska, cancelled bids to have been opened Sept. 29, electric distr. systems at Elmendorf and Eielson Air Force Bases and navigations aids bldg. at Eilson and Kenai, Inv. 54-24, ALASKA. CD 9/3.

▲† **Morrison-Knudsen Co., Inc.**, 319 Broadway, Boise, Idaho, LB **$2,594,230**, est. $2,986,618, roads, streets, parking areas and sidewalks, Eielson Air Force Base, Inv. 54-5, ALASKA. U. S. Eng., Anchorage, Alaska. Bids Sept. 23. CD 9/16.

▲† **Lease & Leighland**, 1501 N. 35 St., Seattle 3, Wash., and **M-B Contg. Co.**, Lloyd Bldg., Seattle 1, Wash., LB **$2,796,073**, est. $3,228,357, road and street paving, storm drainage work, outside utilities, Inv. 54-14, FORT RICHARDSON, ALASKA. U. S. Eng., Anchorage, Alaska. Bids. Sept. 25.

BUILDINGS

LOW BIDS AND CONTRACTS

C. W. **Haufeisen**, Box 1194, Anchorage, Alaska, CA **$217,519**, rein.-con., masonry WAREHOUSE, for City of Anchorage, Aaa 50-A-60, ANCHORAGE, ALASKA. Alaska P. Wks., Dpt. Interior, 123 Third St., Juneau, Alaska. Bids July 7. CD 6/12.

▲† **S. Macri Constr. Co.**, Anchorage, Alaska, LB **$1,296,451**. 65,000 sq. ft., masonry, composite SHOP BLDG., Inv. 54-28, WHITTIER, ALASKA. U. S. Eng., 3013 Arcade Bldg., Seattle 1, Wash. Bids Sept. 24. CD 9/16.

PUERTO RICO

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **U. S. Eng.**, P. O. Box 4970, Jacksonville, Fla. rejected bids maintenance dredging, Inv. 54-1, Arecibo Harbor, PUERTO RICO, LB **$543,212**. CD 9/14, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

▲**Puerto Rico Building Corp.**, Ing Edif Ochoa, San Juan, Puerto Rico, LB **$1,122,969**, OFFICE, SANTURCE, PUERTO RICO. Puerto Rico Water Resources Auth., San Juan, Puerto Rico. Bids Sept. 8.

Proposed Projects

WATER SUPPLY

▲ **Kan., Lawrence**—City, voted **$1,500,000** bonds Sept. 15, water plant expansion, Black & Veatch, 4706 Broadway, Kansas City, Mo., consult. engrs. CD 9/2.

Mass., **Fitchburg**—City, T. E. Kennedy, supt. Water Dpt., City Hall, 1.5 billion gal. reservoir, 9,000 lin. ft. 16- to 24-in. water mains, Mare Meadow, Westminster **$800,000**, Whitman & Hokard, 89 Broad St., Boston, consult. engrs.

Va., **Richmond**—Henrico Co., 22nd and Main Sts., water lines and tanks, Tuckahoe Area, **$496,000**. E. A. Beck, c/o owner, co. mgr.

Wash., **Anacortes**—City, City Hall, increase water supply. $100,000. Carey & Kramer, 1917 1 Ave., Seattle, consult. engrs.

SEWERS, WASTE DISPOSAL

▲ **Kan., Lawrence**—City, voted **$1,500,000** bonds Sept. 15, sewage plant, Black & Veatch, 4706 Broadway, Kansas City, Mo., consult. engrs. CD 9/2, under Water Supply.

▲ **Ky., Louisville**—Metropolitan Sewer Dist., W. Jefferson St., $6,000,000 bond election Nov. 3, sewage disposal plant, **$12,000,000**, Morris Forman, c/o owner. engr. CD 4/22/45.

O., **Parma**—City, City Hall, 6611 Ridge Rd., bond election Nov. 3, incinerator. **$675,000**.

▲ **Va., Richmond**—Henrico Co., 22nd and Main Sts., sewage treatment plant and outfalls lines, Sanitary Dist. A, **$794,500**, R. Stuart Royer & Assocs., Virginia Bldg., consult. engrs.; sewers, pump station and force line, Upham Brook area, **$65,260**; sewer, pump station, force line, Westham Creek area, **$60,890**; outfall and service lines, Horsepen Branch area, **$162,625**; pump station and sewer lines, Jordan's Branch area, **$57,868**; sewers, pump station and force line, Horsepen Branch area, **$112,355**; main sewer line from Three Chopt and Horsepen Rds. to Westhampton Creek and Kanawha Canal, **$222,500**; main sewer line in Westhampton Creek Drainage area, **$117,674**; sewer service lines, Westhampton Creek drainage area, **$524,357**. E. A. Beck, c/o owner, county mgr. CD 6/15.

Wis., **Kenosha**—City, City Hall, storm sewers from lake front to 30 Ave. **$790,000**.

▲ **Wis., Superior**—City, City Hall, sewage treatment plant, **$2,500,000**. Hitchcock & Estabrook, Inc., 521 Sexton Bldg., Minneapolis, Minn., consult. engr. CD 10/3/47.

BRIDGES

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 N. Office Bldg., Harrisburg,

Dauphin and Cumberland Counties—constr. East-West Harrisburg by-pass from Rte. 422-322 east of city to Rte. 11 west of city, incl. $10,000,000 bridge over Susquehanna River between Dock St., Harrisburg and Lowther St., Lemoyne, **$17,000,000**. C. H. Buckius, c/o owner, ch. engr. CD 10/2/50.

PUBLIC BUILDINGS

▲ **Pa., Abington**—HIGH SCHOOL—Abington School Dist., Abington, plans by Joseph Wigmore, 117 S. 17 St., Phila., Senior High School. **$3,000,000**. Lambert-McGee Assocs., 1629 Chestnut St., Phila., consult. engrs.

R. I., **Warwick**—SCHOOLS—City, City Hall, elementary school, Buttonwoods and Main Aves., **$400,000**; elementary school, Pilgrem Park (Norwood). $400,000.

Tex., **Beeville**—HIGH SCHOOL—Beeville Independent School Dist., Beeville, plans by Smyth & Smyth, Gulf Security Bldg., Corpus Christi, high school. **$400,000**. CD 2/18/52.

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Tex., Daingerfield—HOSPITAL—Morris Co., Daingerfield, plans by Wyatt C. Hedrick, archt. and consult. engr., 904 Fort Worth Ave., Dallas, county hospital. **$500,000.** CD 6/10.

▲ **Wash., Seattle**—SCHOOL—School District No. 1, 815 4 Ave. N., plans by Naramore, Bain, Brady & Johnson, 9044 7 Ave., enlarging, altering West Seattle High School, **$1,000,000.**

COMMERCIAL BUILDINGS

Mass., Winchester—CHURCH, etc.—Immaculate Conception Roman Catholic Church, Rev. Hebert K. A. Driscoll, 1004 Main St., plans by Edward L. Shields Assoc., Inc., 1245 Hancock St., Quincy, 2 story, brick, limestone church and school, Sheridan Circle off Main St. **$300,000.** CD 2/6/50.

▲ **N. Y., New York**—OFFICE, etc.—Webb & Knapp, Inc., 270 Park Ave., New York, Zone 17, plans by Lester C. Tichy, 369 Lexington Ave., Zone 17, 20 story office and showroom bldg. over Penn. R. R. yards between 9 and 10 Aves., 31 and 33 Sts. **$100,000,000.** Seelye, Stevenson, Value & Knecht, 101 Park Ave., Zone 17, consult. engrs. I. M. Pei, c/o owner, archt.

Pa., Lebanon—CHURCH—Holy Trinity Lutheran Church, 727 Lehman St., plans by T. Norman Mansell, 262 S. 17 St., Phila., church addn. **$300,000.** Lambert-McGee Assocs., 1629 Chestnut St., Phila., consult. engrs.

Pa., Phila.—SCHOOL—St. Nicholas of Tolentino, 910 Watkins St., plans by Engineering Consultants & Anthony Orefice, 943 N. 19 St., school addn. **$300,000.**

Tex., Laredo—HOTEL—Hamilton Hotel, Laredo, plans by C. J. Finney & L. Bauml, Associated, 209 San Pedro St., San Antonio, hotel remodeling, addns., concrete fdn. and steel frame will be constr. for addn., etc. **$300,000.** George R. Rhine, 209 San Pedro St., and Chas. A. Reynolds, Jr., 500 Insurance Bldg., San Antonio, consult. engrs.

Tex., San Antonio—GYMNASIUM—Sisters of Charity of the Incarnate Word, Incarnate Word College, Broadway Ave., plans by Julian & White, 2901 Transit Tower, brick, gymnasium, concrete grade beams and pier fdn. **$300,000.**

Que., Magog—HOSPITAL—Hospital de la Providence, 99 E. Main St., plans by A. Poulin, 115 Prospect St., Sherbrooke, 200-bed hospital, **$500,000.** CD 9/15.

▲ **Que., Montreal**—CLINIC—Institute Bruchesi, 1464 St. Hubert St., plans by Crevier, Lemieux & Mercier, 1065 Pratt Ave., Outremont, clinic, Rachel St. **$1,000,000.**

INDUSTRIAL BUILDINGS

▲ **Ill., Skokie**—PRINTING PLANT, etc.—Commerce Clearing House, 214 N. Michigan Ave., Chicago, Zone 1, plans by Skidmore, Owings & Merrill, 100 W. Monroe St., Chicago, Zone 3, part 1 and 2 story, 200,000 sq. ft. printing plant and offices, Greenleaf and LeClaire Sts. **$2,500,000.**

▲ **Ia., Des Moines**—GRAIN ELEVATOR—Farmers Grain Dealers Assn., 1101 Walnut St., grain elevator. **$3,500,000.**

Pa., Phila.—SALES and SERVICE—Keeley Chevrolet Co., Inc., 3330 N. Broad St., plans by Clifford E. Garner, 10 S. 18 St., auto sales and service. **$150,000.** CD 1/21.

▲ **B. C., Vancouver**—PLANT—Richard M. Reiner, Vancouver, B. C., c/o Bolma Miller & Co., consult. engrs., 1104 Hornby St., steel pipe and tube mill plant. **$1,700,000.**

▲ **Newfoundland, Grand Bank**—PROCESSING PLANT—Ronavista Cold Storage Co., Grand Bank, processing plant. **$1,500,000.**

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Mich., Muskegon—PARKING FACILITIES—City, City Comn., off street parking facilities. **$800,000.**

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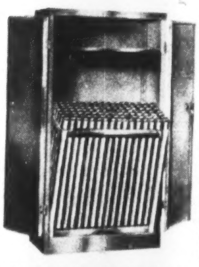

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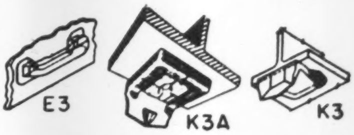

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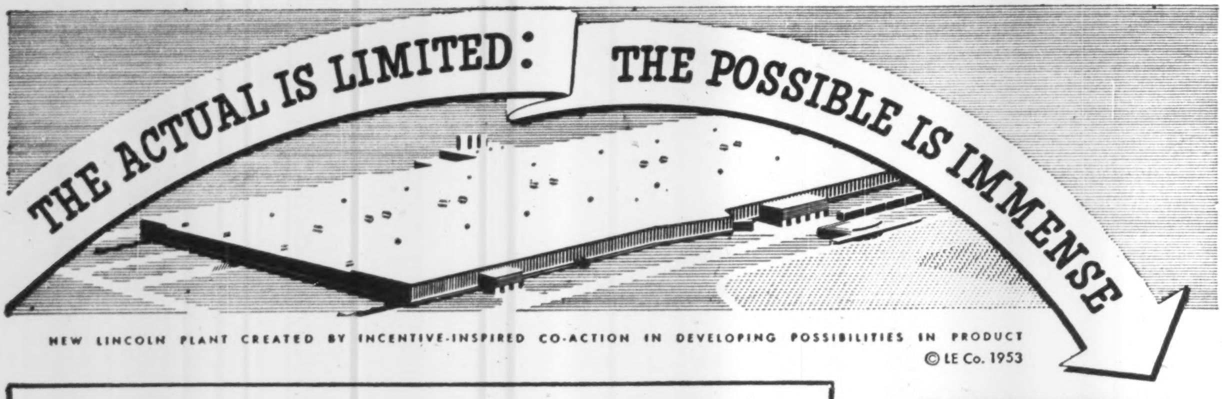
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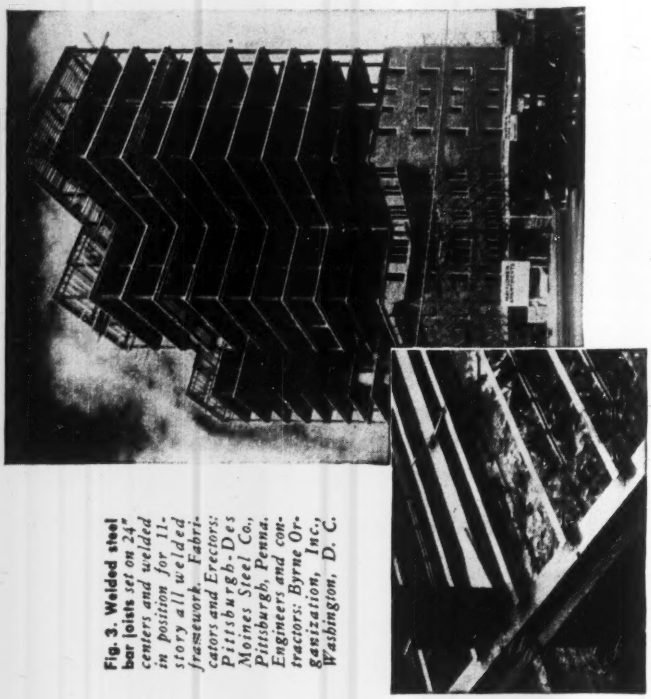

Fig. 3. Welded steel bar joists *set on 24" centers and welded in position for 11-story all welded framework. Fabricators and Erectors: Pittsburgh-Des Moines Steel Co., Pittsburgh, Penna. Engineers and contractors: Byrne Organization, Inc., Washington, D. C.*

SIMPLE DETAIL SPEEDS ERECTION

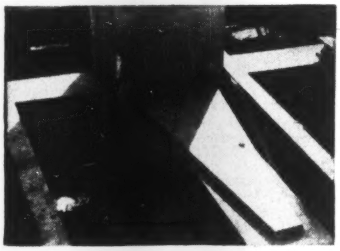

Fig. 1. Faster beam-to-column connections. *Clip angle is shop welded to column for bolting beam in the field. Outside cover plates are then field welded to top and bottom flanges and the top plate to column in flat position with Lincoln "Fleetweld 5" electrodes. Bottom plate is shop welded.*

FASTER COLUMN SPLICES

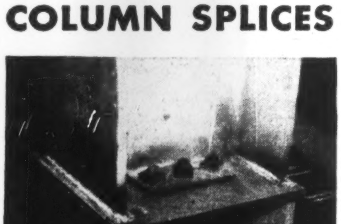

Fig. 2. Typical welded splice *of all columns 12 to 12 and 12 to 14 WF column. Bearing plate is shop welded to lower column . . . clip angle for erection bolts is shop welded to upper column. All field welds are made in fast, easy downhand position.*

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Use of inside help for construction worries contractors building crafts

In setting up a committee to seek an end to chronic jurisdictional disputes (ENR Oct. 1, p. 27) the American Federation of Labor may find answers for the carpenters—and other building trades—who complain that a growing proportion of plant construction and expansion work is done by plant employees.

The carpenters' recent vacation from the AFL pushed into the spotlight the complex issue of management's choice of assigning plant construction to workers represented by inside unions or giving the work to contractors employing AFL building craftsmen.

Development of the problem has been traced in an analysis by the Bureau of National Affairs, Inc. While rivalry between inside and outside unions for plant construction assignments has plagued labor relations for years, the postwar boom in industrial expansion and modernization has aggravated the difficulty, according to BNA's report.

Current atempts by the AFL to root out the trouble can be regarded partly as an appeasement of the carpenters and partly as a step in efforts of the AFL—spurred by its aggressive president, George Meany—to clean up its house.

Other unions, too, have complained of the AFL failure to enforce jurisdictional rights. One is the Brotherhood of Maintenance of Way Employees, (182,000 members) with headquarters in Detroit. Its complaint is that railroads use brotherhood members for construction on railroad rights-of-way.

This jurisdictional problem also has become a matter of concern among the general contracting industry. Non-construction companies using their own men often do their own subcontracting, thus avoiding general contractors.

The issue remains as one of the basic forces for division in the labor movement, not only between AFL and CIO but within the AFL itself.

At stake in any future resolution of the issue are management's freedom of choice in assigning work, the accomplishment of plant construction by workers earning $3 an hour as against those earning nearer $2, and the wage standards enjoyed by building trades unions.

At U.S. Steel, for example, the company's right to contract out work of this kind was the subject of many disputes in the years after the war.

In hearings before the Wage Stabilization Board's Steel Panel last year, the steelworkers argued for an amendment on contract coverage which would have provided that the local union must agree before work is contracted out, and that any work in and around the company's property should be done by local union members—except for entirely new construction.

Local agreements covering these issues did exist at the time, but the union wanted to cover the subject in the national agreement in a manner more acceptable to it. But U. S. Steel contract is still silent on this.

Other contracts, however, have specifically endorsed or limited management's freedom to subcontract plant construction work.

• **The UAW way**—The Ford Motor Co.'s contract with CIO's United Auto Workers includes an agreement outlining the company's policy to utilize fully its seniority employees in maintenance and construction work.

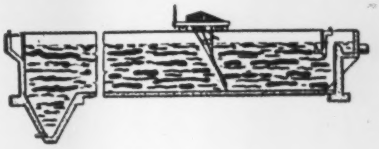
In a contract between the New York Corp. and an independent

Make needs known

Fresh from a conference with President Eisenhower last week, two top men in the AFL Building and Construction Trades Department—Richard Gray, Department chief, and Maurice Hutcheson, boss carpenter—said they told Eisenhower the building trades need at least four amendments to the Taft-Hartley Law:

- A change to permit contractors to make union shop agreements before work begins on a job.
- Specific exemption for the construction industry from state right-to-work laws.
- Relief from the secondary boycott ban so as to permit union men on a union project to picket when nonunion men are brought on the job.
- Repeal of the section allowing employers to make work assignments.

Admitting that the talks were exploratory, Gray commented, "It doesn't make much difference what the President thinks. Practical men know that Congress is going to handle it anyway."



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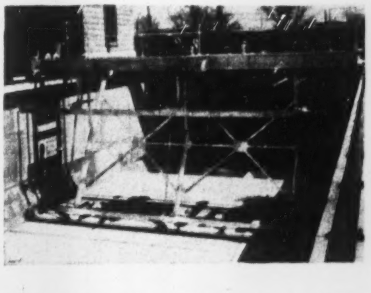

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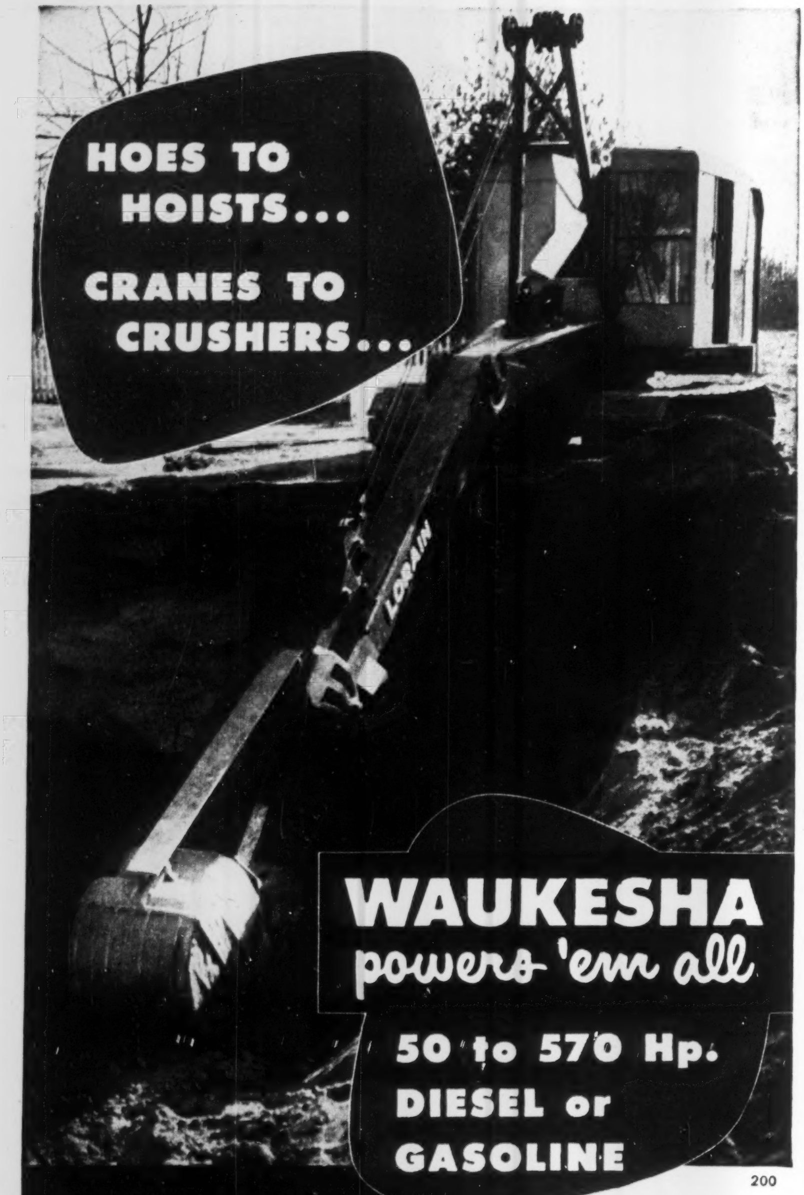

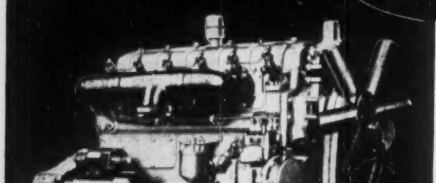

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union, the company agrees as a policy to refrain from contracting out construction work if its own employees are able to perform the work on time and at comparable cost.

Timken-Detroit Axle Co. agrees to consult with UAW-CIO on construction jobs which must be sent out for reasons other than lack of suitable equipment in the plant. Thus the union has a chance to discuss the possibility of cutting costs enough to keep the job inside—but final decision rests with management.

Other companies have agreed not to contract out work normally done by their own employees, not to cause layoffs because of subcontracting maintenance or repair work, or to inform the union of any subcontracting.

The hard facts of the case—particularly frustrating to the carpenters—are these:

- The choice of assigning construction work to inside employees or contracting it out ordinarily rests with management.
- Inside unions are equally jealous of construction work opportunities.
- The carpenters' union is prevented by the injunction provision of the Taft-Hartley Act from exercising its powers to win a traditional solution of the problem by means of picketing activities.

Arbitrators generally have upheld management's freedom to contract work out in the absence of specific contract restrictions. This is true even where inside employees could have accomplished the subcontracted work. Clauses cited by the union on job classifications, recognition of the union, and assignment of work within the bargaining unit were not considered to constrict the right to subcontract. Neither was a clause establishing seniority units and prohibiting their unilateral modification.

● **In the middle**—But where a company normally uses its own employees to perform plant construction or repair work, it could run into trouble by changing this pattern without first consulting the union, BNA thinks. In this connection, arbitrators have said that the absence of specific restrictions on the right to subcontract does not necessarily give management an unqualified right to do so.

The National Labor Relations Board has most often entered the problem of subcontracting in cases where production rather than construction work was concerned. (A sharp distinction might be drawn between the two since subcontracting of production work is much more likely to involve the union agreement or the determination of "working conditions.")

The NLRB's general view is that an employer's unilateral action in subcontracting work may constitute a refusal to bargain.

The leading case on the problem—arising while the Wagner Act was still in force—entailed a reversal of the board by the Court of Appeals at Cincinnati. The board had held that an employer refused to bargain when he declined to discuss subcontracting with a union and insisted instead that the union take the matter up through the contract's grievance machinery.

It was the company's position that subcontracting was a right reserved to it under a general management clause, but that any differences over this interpretation of the contract should be handled under the agreement's grievance provisions.

The Cincinnati court upheld the company's position, reversing the board.

Thus management retains a relatively free hand in determining whether to contract out the type of work whose occasional loss has so disturbed AFL's carpenters and other building trades unions. Major exceptions—both relatively rare—would be where management has agreed to some contractual restriction upon its right to contract work out, or where it has been the practice to use inside employees to handle the work.

All this makes the nature of the carpenters' difficulty clearer. From the union's point of view, management is the key to the issue since it is management which makes the final decision as to whether to put plant expansion into the hands of building contractors.

The carpenters will have to focus pressure on plant management. But provisions of the Taft-Hartley Act regarding jurisdictional strikes—and strikes where another union has been certified—have pretty well put such action outside the carpenters' power. Moreover, there has been growing sentiment some states—such as New York—to enjoin strikes or picketing carried out by unions not representing employees.

At the same time, management's own concern is to minimize the cost of plant expansion to the extent possible by utilizing inside workers.

But employers frequently must subcontract some part of a plant construction job. And there is the possibility that other building trades unions will cooperate by withholding their labor until plant management agrees to contract out entire jobs, rather than small portions of them when unavoidable.

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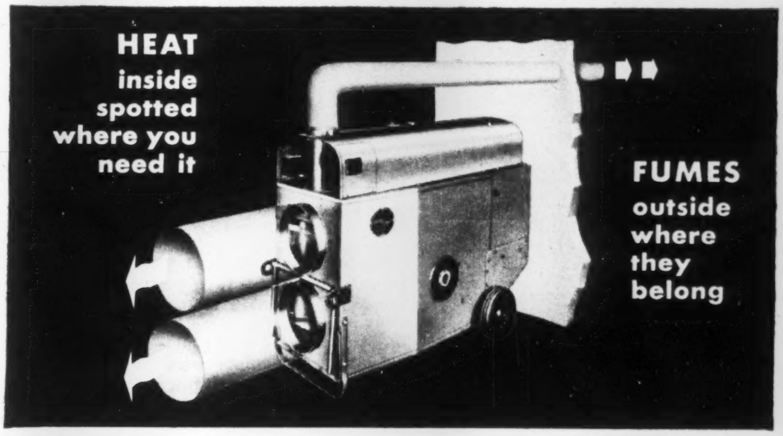

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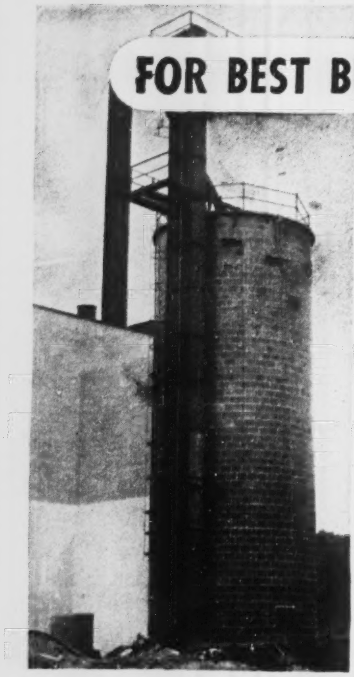

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LABOR

Showdown near at Joppa

Explosive tension was building up last week at Joppa, Ill., where construction of a $195-million power plant, resumed on a modest scale after a switch in contractors, has been stopped cold. Immediate cause of the stoppage was the resignation of 33 ironworkers from the payroll of Bechtel Corp., new contractor, in a tiff over the hiring of six ironworkers.

Bechtel and the ironworkers, members of Local 595, with headquarters at Paducah, Ky., a few miles from Joppa, are deadlocked. The workers won't call off a blockade, which other building craftsmen won't pass to go to their jobs on the Joppa project, unless Bechtel backs down on its original request to add six handpicked ironworkers to their work force. And Bechtel says it won't rehire the 33 ironworkers.

Bechtel apparently is staking its hopes for a resumption of work on a new ironworkers local, 758, which the ironworkers international has chartered to by-pass Local 595. But so far, despite the blessing of top American Federation of Labor leaders and the promise of an international organizer to make a deal with Local 595 members who will join his Local 758, there has been no rush to swell the ranks of the insurgent union.

Members of Local 595 who are employed at two other major projects—a power plant at Shawnee, Ill., being built by TVA, and a $1-billion gaseous diffusion plant being built for the Atomic Energy Commission at Paducah—had been joining the Joppa ironworkers' blockade in sympathy. But the business agent of Local 595 has sent increasing numbers of the sympathy strikers back to their jobs in order to keep the two projects open.

Labor briefs . . .

- **Billings building resumes**—Construction in Billings, Mont.—halted by a 65-day strike of 2,500 workers—has been resumed after contractors and union officials (plumbers and steamfitters) agreed to submit their deadlocked dispute to federal mediation. The union's demand: a wage increase from $2.65 per hour to $2.77; contractors offer a 10-cent hourly boost.

- **Houston work hums**—After a partial paralysis since July 13, building work in Houston, Tex., area started up again last week on $75 million worth of construction. The AFL operating engineers voted to accept a contractors' offer of a 17½-cent hourly raise now for heavy work, plus an extra 12½ cents next year. The boost will make the engineers' scale \$2.77½ now and \$2.90 after Jan. 1.

• **Powder plant picketed**—Some 2,900 construction workers rehabilitating the Indiana Ordnance Works in Charlestown, Ind., went off the job recently because AFL sheet metal workers picketed entrances to the powder-producing unit of the arsenal. Randolph Heyser, union business agent, gave a reason: certain agreements between his union and management had not been carried out. He acknowledged that about 250 members stayed off the job, but denied they picketed.

• **Atomic project dispute**—A U. S. District Judge in Spokane, Wash., has ordered AFL machinists to end their two-week-old strike against Kaiser Engineers on a building project at the Atomic Energy Commission's Hanford Works near Richland, Wash. The judge signed an injunction on the petition of the NLRB. Machinists walked out in protest when the company assigned a machinery replacement job to AFL millwrights.

In Alaska, a cold shoulder

Eight carpenters and two bricklayers were stranded in Fairbanks, Alaska, last week after a flight from Seattle on a promise of jobs that did not exist.

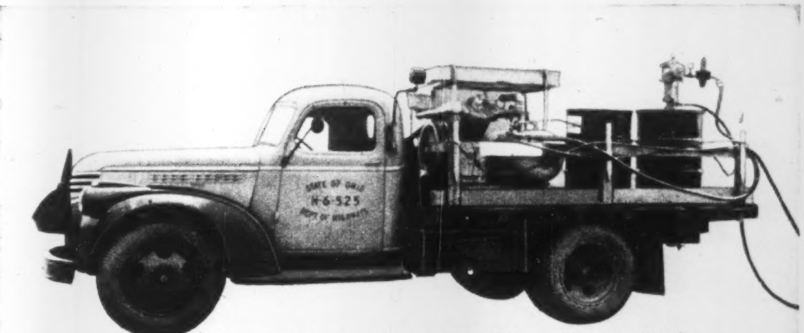
The men were flown north on the understanding that the construction firm of Reed & Martin was to foot the bill. However, Lloyd Martin, president of the firm, said his concern had nothing to do with the job offers, has no jobs to offer the men and has no responsibility in the case. He did pay for two days' lodging, however.

In Seattle, meanwhile, a Tom Martin, Jr. was in jail on a grand larceny warrant, charged with taking \$80 from another man on the promise he could get him a job in Alaska.

Transferred from jail to a hospital when he became seriously ill, Martin told this story:

Just down from Alaska, he hired a hotel room, a secretary and a full-time taxicab. Then he put in calls to Seattle carpenters and bricklayers unions for 40 men for "a big rush job at Fairbanks."

Eight carpenters and three bricklayers signed up. (One bricklayer became suspicious and stayed behind.) Martin is alleged to have used the name of the Alaska contracting firm to arrange credit for flying the men to the "job."



Compact truck unit used by Ohio Highway Dept., Div. of Maintenance, containing compressor, pump and drums of Presstite No. 77.

More state highway departments are swinging to *Cold Applied* PRESSTITE No. 77 Paving Joint Sealer

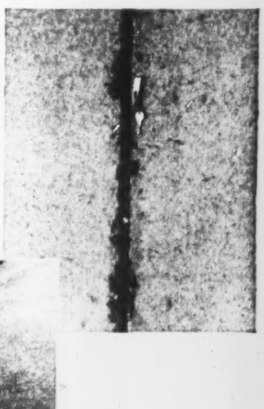
In search for a paving joint sealer that would provide longer lasting, more satisfactory service as well as easier application, Ohio conducted experimental tests in 1951 and 1952 using Presstite No. 77 sealing compound.

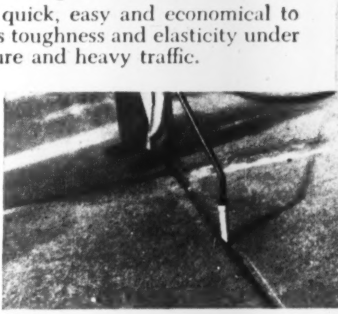
After thorough study of the highway test sections, the State of Ohio Department of Highways adopted Presstite No. 77 *cold applied* paving joint sealer for concrete and bituminous paving (Specification No. M-110.26).

Here is an ideal paving joint sealer for new pavements and maintenance re-sealing that remains flexible, resilient and adhesive, withstands repeated expansion and contraction of the pavement, and forms an impervious barrier against passage of water through the joints and into the sub-grade below.

Presstite No. 77 is quick, easy and economical to apply . . . maintains its toughness and elasticity under extremes of temperature and heavy traffic.

Excellent condition today of concrete joint on Ohio highway sealed October, 1951.





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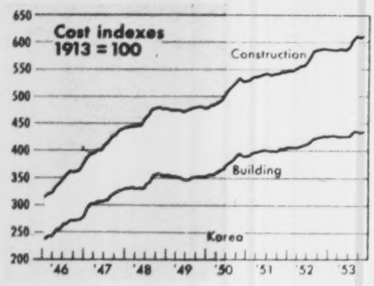
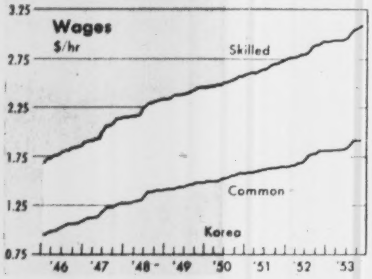
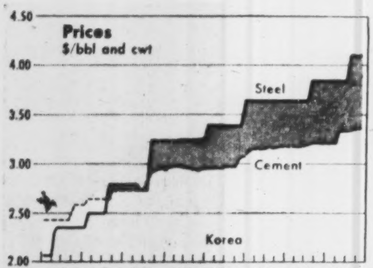
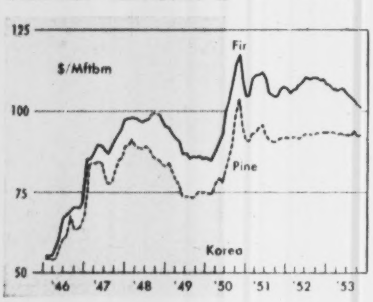
OCTOBER CONSTRUCTION SCOREBOARD









ENR INDEXES (1913 = 100), 20-cities' average	1953 Oct.	% Change from last Month	% Change from last Year
Construction Cost	610.76	+ 0.1	+ 3.8
Building Cost#	436.31	+0.05	+ 2.7

Sept. Revised 436.10

WAGE RATES, 20-cities' average	1953 Oct.	% Change from last Month	% Change from last Year
Common	$1.927	+ 0.3	+ 6.1
Skilled (aver. 3 trades)††	3.085	+ 0.4	+ 5.6
Bricklayers	3.364	+ 0.2	+ 3.6
Structural Ironworkers††	3.051	+ 0.8	+ 7.1
Carpenters	2.840	+ 0.1	+ 6.5

†† Sept. Revised Skilled .... 3.073 Struc. Iron 3.026

MATERIAL PRICES, 20-cities' average	1953 Oct.	% Change from last Month	% Change from last Year
Cement, bulk, per bbl	$3.359	+ 0.3	+ 4.3
Structural Steel, (3-mill aver.), per cwt	4.100	0.0	+ 6.5
Sand, per ton	2.192	0.0	+ 4.0
Lumber, 2x4 Fir, per M. ft. bm	100.625	− 1.1	− 8.4
Lumber, 2x4 Pine, per M. ft. bm	91.000	+ 0.1	− 2.3
Common brick, per M	32.574	− 0.6	+ 3.1
Ready-mixed concrete, per c. y	11.938	+0.02	+ 5.8
Structural Clay Tile, 3x12x12 per M	159.726	+ 0.1	+ 3.8

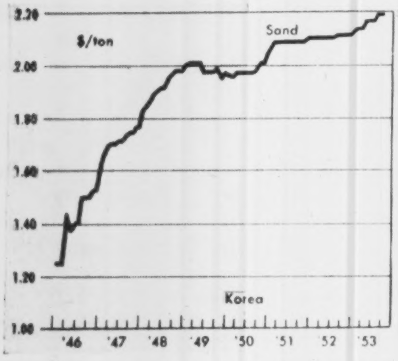
CONTRACTS AWARDED (Millions)	1953 Sept.	1953 9-Mos.	% Change from '52	
Total U. S. (ENR reported)	$1,116.6	$11,396.4*	+17.3	− 7.0
Private	619.7	6,474.5	+40.2	+26.1
Public	496.9	4,921.9*	− 2.6	−30.9
Federal	89.8	1,154.9	−62.9	−70.9
ENR Volume Index, '13 = 100	487	529	+10.4	−12.7

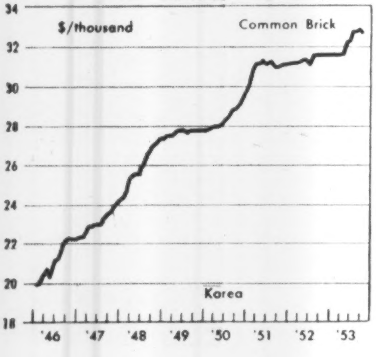
* Revised, $66,070,000 Mackinac Bridge contract removed, bonds not sold

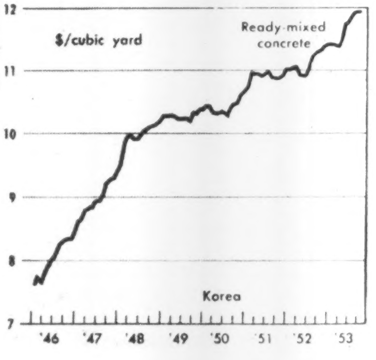
NEW CAPITAL (Millions)				
Total	560.2	9,373.3	−48.9	−32.4
State & Municipal Bond Sales	289.5	3,436.1	+18.9	+30.7
Corporate Security Sales	265.7	3,481.2	+31.0	+23.9
Federal (non-federal work)	5.0	860.4	+56.3	+0.5
Federal (federal work)		1,595.6	−100.0	−79.0

MATERIAL SHIPMENTS & LABOR SUPPLIES (Millions)	July(J) Aug.(A)	7-Mos.(7) 8-Mos.(8)	% Change from '52 Mo.	% Change from '52 Yr.-Cum.
Cement bbls, Bu. of Mines	26.480(J)	145.183(7)	+ 5.5	+ 5.0
Fabr. Struc. Steel, tons AISC	.251(A)	2.041(8)	+11.1	+18.3
Lumber, mil. ft. bm., NLMA	3.207(J)	22.836(7)	+ 5.8	+ 9.5
Lumber Prod., mil. ft. bm., NLMA	3.337(J)	22.654(7)	+ 4.4	+ 7.6
Contract Constr. Employ., BLS	2.708(A)	2.472(8)†	− 3.8	− 1.7

† Average







September awards set record: Mass housing climbs sharply

Heavy construction contract awards reported in September by ENGINEERING NEWS-RECORD and the Construction Daily topped $1.1 billion. It was the biggest September on record in terms of dollar volume, 17% ahead of September 1952, and slightly ahead of dollar volume reported for the previous month.

Comparing September with August, private construction awards gained slightly, rising from $605 million in August to $620 million in September. State and municipal awards dipped a little, down to $407 million from $414 million in the previous month. Federal volume also was down slightly, totaling $90 million in September as compared with $92 million in the month before.

• **Private**—In the private field, a sharp gain in mass housing awards more than offset declines in all other categories. Volume of mass housing awards was $310 million, against $150 million in the preceding month. It was the biggest month for housing awards since May. Volume of industrial building awards was $163 million, compared with $248 million in August. Early indications for October are that this drop in industrial contracts may be temporary. Commercial awards dropped to $71 million, after very heavy volume in nearly every month since March.

• **Public**—In public construction, sewerage and highway volume registered big gains. But these gains were not sufficiently large to offset declines that occurred in all other types of public works.

Sewerage contracts totaled nearly $60 million in September, the largest monthly total on record. Highway awards climbed to $164 million after the dip in August.

For the first nine months of this year, total awards were $11.4 billion, down 7% from the record $12.3 billion in contracts let in the 1952 period. However, if you exclude Atomic Energy Commission contracts, which totaled more than $2.3 billion in the first nine months of last year as compared with only $59 million so far this year, volume is 14% above 1952. Private construction shows the biggest gain—up 26%. Due to a 71% decline in federal awards, total public work is down 31%. However, state and municipal work is running 20% ahead of the figure for last year.

Construction costs edge up because of wage increases

After September's slight decline from the all-time high in construction costs reached in August, they advanced slightly for October. Scattered wage increases, plus a boost in cement prices for one city, offset further declines in lumber prices.

As a result, the Construction Cost Index for October computed by ENGINEERING NEWS-RECORD is 610.76, based on 1913 = 100. The new level is 0.1% above September, and 0.2% below the record high of 611.87 reached in August.

ENR's Building Cost Index for October is 436.31, also based on 1913 = 100. The new index is 0.5% above September, and slightly below the record high of 436.98 of last August.

In the 12 months since October 1952, the Construction Cost Index has risen 3.8% and the Building Cost Index 2.7%. Costs have risen much slower this year than in 1952. One reason is the decline in lumber prices. Another is the fact that 1953's wage increases did not match the fat raises granted in 1952.

ENGINEERING CONSTRUCTION CONTRACTS—SEPTEMBER 1953

ENGINEERING NEWS-RECORD *reports continental U. S. Construction projects of the following minimum costs—Waterworks, excavation, drainage and irrigation, $34,000; other public works, $60,000; industrial buildings, $82,000; other buildings, $300,000*

Four Weeks—Thousands of Dollars (000 Omitted)

	September, 1953							—U. S. Cumulative Nine Months—		%	Canada
	New England	Middle Atlantic	South	Mid-West	West of Mississippi	Far West	Total U. S.	1953	1952	Change '52 to '53	September 1953
Public Works											
Waterworks	340	1,314	3,282	2,866	5,583	1,297	**14,682**	**183,519**	169,223	+ 8	1,535
Sewerage	1,284	35,353	6,537	6,275	6,735	3,751	**59,935**	**334,373**	221,882	+51	1,402
Bridges	643	15,061	5,421	33,769	5,799	9,168	**69,861**	**507,730***	274,516	+85	854
Earthwork and drainage	202	118	1,315	6	7,152	8,426	**17,219**	**299,510**	378,328	−21	1,273
Streets and roads	5,921	81,539	24,228	17,655	24,482	10,475	**164,300**	**1,360,608**	1,164,403	+17	8,415
Public buildings, residential	....	1,038	1,654	3,866	725	1,801	**9,084**	**321,985**	507,262	−37	933
Other public buildings	9,693	14,362	33,982	16,762	20,023	14,208	**109,030**	**1,276,237**	3,778,877	−66	10,872
Unclassified	2,357	9,921	8,985	3,682	21,019	6,765	**52,729**	**637,902**	631,129	+ 1	7,728
Total public	**20,440**	**158,706**	**85,404**	**84,881**	**91,518**	**55,891**	**496,840**	**4,921,864***	**7,125,620**	**−31**	**33,012**
Federal government (included in above classifications)	2,195	5,796	25,402	6,182	29,005	21,187	**89,767**	**1,154,942**	3,975,414	−71	9,800
Private											
Bridges	....	....	....	....	....	....	....	**7,188**	15,179	−53	....
Industrial buildings	980	17,042	49,286	44,588	46,926	3,968	**162,790**	**2,045,741**	2,002,874	+ 2	24,765
Mass housing	10,050	149,678	26,723	61,162	48,344	14,085	**310,042**	**2,759,687**	2,278,687	+21	10,335
Commercial buildings	5,659	18,434	8,234	10,262	26,227	1,858	**70,674**	**911,059**	470,464	+94	5,535
Unclassified	....	340	28,983	18,763	24,818	3,322	**76,226**	**750,866**	363,184	+107	....
Total private	**16,689**	**185,494**	**113,226**	**134,775**	**146,315**	**23,233**	**619,732**	**6,474,541**	**5,130,388**	**+26**	**40,635**
Total Engineering Construction:											
September, 1953—4 weeks	**37,129**	**344,200**	**198,630**	**219,656**	**237,833**	**79,124**	**1,116,572**	....	....	....	**73,647**
August, 1953—4 weeks	38,676	210,285	165,389	288,905	221,357	186,601	**1,111,213**	....	....	....	81,359
September, 1952—4 weeks	55,817	153,299	130,951	170,138	203,838	238,175	952,218	....	....	....	72,129
Nine Months—1953	**489,849**	**2,632,055**	**2,063,879**	**2,490,159***	**2,388,907**	**1,331,556**	....	**11,396,405***	....	**− 7**	**788,863**
Nine Months—1952	459,570	**1,881,871**	3,063,627	2,885,462	2,586,160	1,379,318	....	....	12,256,008	....	771,119
% Change '52 to '53	+7	+40	−33	−14	−8	−3	....	....	....	....	+2

* Revised—$66,070,000 for Mackinac Bridge contract removed, bonds not sold.

Tax exemption on income earned abroad

Joseph J. Schwartz
Schwartz & Meyers
New York, N. Y.

HELP WANTED—ENGINEER, C. E., overseas construction, salary high. State qualifications, references, etc.

At one time or another, most engineers have considered a job overseas. And one reason why they do is the preferential tax treatment which the Bureau of Internal Revenue gives to income earned outside the U. S. Though there has been a lot of publicity about movie stars who stay abroad 18 months to avoid income tax, Congress intended this provision of the tax law to encourage engineers and technicians to work abroad. It recently emphasized this by limiting such tax-free income to $20,000 a year.

How does the 18-month provision apply to you? If you can't qualify under this provision, is there any other way of keeping foreign-earned income tax free? Here's how the law works:

If you are physically present in a foreign country for 510 days (about 17 months) during any 18-month period, all foreign income you earn up to $20,000 a year is tax free. "Foreign income" here means income earned outside the U. S., whether you work for a foreign company or an American company. But it does not include income received from the U. S. government or any of its agencies.

• **Employee vs. employer**—This means, oddly enough, that if you work for an engineering or construction firm employed by the U. S. government, your income is tax-exempt. But if you are a partner in, or owner of, a company working for the U. S., your income is taxable. There is quite a distinction made in the tax law between an employee and a "principal" (partner or owner). If you are a principal in a firm working overseas, but not for the U. S. government or its agencies, you can qualify for some tax exemption. We'll get to that later.

Suppose that you are an employee, and then let's see how the tax law applies to your case. You have been offered a job on a construction project in Guatemala, under a two-year contract at $15,000 per year. If you leave the United States next January 1 and remain away for the entire two years, you pay no income tax at all on the $30,000 earned.

This is so even if you should return home for a month's vacation some time during the two years. As a matter of fact you might even take two such monthly vacation trips and still retain the tax exemption if you are careful to space them at least 17 months apart. If you don't stay in Guatemala for the entire two years, but you do stick it out for 17 months, you still pay no income tax on your Guatemala salary. But if you don't stick it out for at least 510 days your entire Guatemala salary is taxable.

Thus your mere presence in a foreign country for the required period is enough to exempt all your salary earned abroad. Watch out for this though: The number of days spent overseas is strictly construed. You must spend 510 full days in the foreign country, not counting days of arrival and departure. And if you should spend any time in the United States in excess of the time allowed—even one day, and for no matter what reason—you will forfeit the entire tax exemption.

• **Limit**—Of course, if you're going to earn more money, you may not get off scot-free. If your Guatemala contract calls for a salary of $25,000 a year and you qualify under the 18-month provision, only $20,000 is exempt and you will pay tax on $5,000 each year. And if you qualify under the 18-month provision but spend only a fraction of some year abroad, you receive only that fraction of $20,000 as exempt income.

For example: You go to Guatemala on Jan. 1, 1954, and return home June 30, 1955, earning $25,000 abroad for 1954 and $12,500 abroad for 1955. Your exemption is $20,000 in 1954 and your taxable income $5,000, while your exemption is $10,000 in 1955 and your taxable income $2,500.

You can see now that if your proposed employment is likely to keep you overseas at least 17 months and if you earn under $20,000 a year your earnings are going to be tax free. But what if you won't be away for 17 months? Or what if you must make frequent trips home so that you can't string together 510 days abroad in any 18-month period? Do you lose out on tax-free income? Not necessarily. There may be another way out.

• **Bona fide resident**—Under another and less publicized tax provision, income earned outside the United States is tax free if you become a bona fide resident of a foreign country for an entire tax year. This too applies if you work for an American or a foreign company but not for the U. S. government or its agencies.

This provision has three distinct advantages over the other: You don't have to stay overseas 17 months. There is no $20,000 limitation on earnings. And you can make as many trips home as you like without fear of losing the exemption.

• **Requirements**—But you have to observe carefully the two requirements: You must establish bona fide residence in a foreign country and you must maintain that residence for an entire tax year.

Let's first examine the residence requirement. Establishing a bona fide residence is basically a question of intent. If you give up your home in the United States and move down to Guatemala with the intention of residing there indefinitely, you have established bona fide residence in Guatemala. So in order to obtain tax exemption you must demonstrate to the tax authorities by your actions that such was your intention.

These are the actions that will indicate an intent to establish residence abroad: You give up your home here and move your possessions to Guatemala. You take your wife and family along. You rent quarters and pay for them out of your own pocket. And you pay taxes in Guatemala. You needn't give up your U. S. citizenship however. And you may even have your salary deposited to your account in a United States bank.

These actions, on the other hand, probably will prevent your proving residence: You keep your house in the United States. You leave your family at home. You take a job for a definite period of time. You live in barracks or quarters provided by your employer. These are all inconsistent with an intention to reside abroad indefinitely.

• **Tax year**—Now having established bona fide residence, the other requirement is that you maintain it for a full tax year.

This refers to the period in which you report your income. Most people report their income from Jan. 1 to Dec. 31, but this does not have to be so and you have the right to start and end your tax year on whatever dates you choose, provided you get prior approval from the Treasury.

Assume however that you report from Jan. 1 to Dec. 31, as most people do. If you go to Guatemala next Jan. 1, establish residence, and remain until Dec. 31, your entire year's income will be tax free whether you earn $15,000 or $50,000 and no matter how many times you visit the United States.

But if you go down next March 1 and stay until June 30, 1955, you get no tax exemption whatever, although you will have been in Guatemala for more than a year. This is because you will not have been there during your entire tax year.

• Advance planning—It becomes clear now that what you do or fail to do before you go overseas may determine whether or not you pay any tax.

If you earn under $20,000 and know you'll be away longer than 17 months you're on safe ground, barring unforeseen trips home.

If your situation is otherwise, however, plan to do these things before you leave:

Try to get a cost-of-living allowance as against living quarters furnished by your employer. Have your employment contract provide that you shall "reside" in Guatemala and shall maintain residential quarters of your own choosing at your own expense. Don't have your employer pay your Guatemala taxes. And the contract should be for an indefinite term, with appropriate cancellation clauses, since a definite term probably will prevent establishing residence. Keep in mind that a carefully worded contract will go a long way toward establishing proper proof of residence. Lastly, give up your quarters in the United States if possible and take your family and possessions with you.

• Other tips—There are, of course, other tax strategies that may be helpful in some situations. Here are a few:

If you are working for a company under a long-term contract and your job keeps you overseas for extended periods, it may be wise to take the greater bulk of your salary for the overseas service and thus get it tax free. It is also preferable to have reimbursable business expenses added to your salary while you are overseas, so that you can treat them as tax-free income rather than as expenses which you won't otherwise be able to deduct.

And with respect to your tax year, a little foresight may prove all important. You might, for example, arrange to have your tax year coincide with the beginning of your overseas employment. Thus, if you're going to establish residence in Guatemala in March of 1954, you obtain permission from the Treasury before leaving to change your tax reporting year so that it ends on March 31. If you return then to the United States on June 30, 1955, you will pay no tax on any of your foreign compensation. If you did not change your reporting year, all your Guatemala income would be taxable.

• Employers—The discussion so far has been in terms of income earned by an individual employee. But employers are by no means out in the cold. To an engineer who employs assistants, all amounts received as professional fees for overseas services are earned income for the purposes of both the 18-months and foreign residence provisions. And the same holds true of the distributive share of the fees of a partner in an engineering firm.

In many cases, too, an individual or partnership engaged in construction work overseas can take advantage of these provisions, in this way:

If you qualify either under the 18-months or foreign residence provisions, you are not employed by the U.S., and your income consists of construction business profits earned in a foreign country, you may consider up to 20% of such net profit as compensation for your personal services and exclude this percentage from your taxable income.

• No corporations—But note this well: None of these provisions apply to corporations. Obviously, there may be important tax advantages in operating abroad as an individual or partnership rather than under the corporate form.

A word of caution before summing up: It is not possible to touch here upon all aspects of every situation. Special rules, for example, apply to income earned in U.S. possessions. And special tax exemptions are provided by tax treaties in effect with many foreign countries which ease the burdens of double taxation or of high foreign tax rates. They should be investigated in appropriate cases.

But, generally speaking, these are the ground rules to follow:

(1) Make your plans before you leave with the tax consideration in mind.

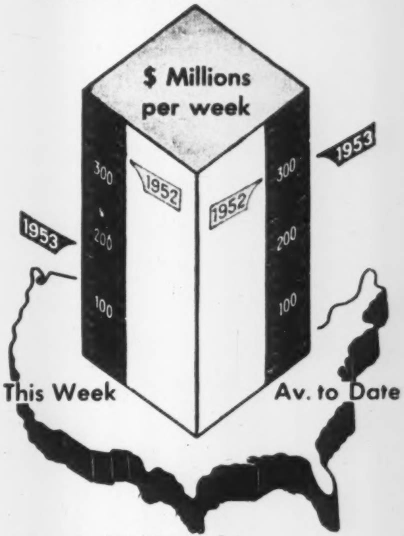
(2) Check carefully your time spent overseas. The provisions are closely construed.

(3) Arrange to be away at least 17 months if possible.

(4) And if not, try to establish bona fide residence abroad.

Activity This Week

As reported to ENR (in millions of dollars)



Amount of contracts let

	This Week*	Cumulative 41 wks 1953	1952	% chge
Federal	$14.4	$1,194.5	$4,038.2	−70
State and municipal ..	71.4	3,937.0	3,315.1	+19
Total pub...	85.8	5,131.5	7,353.3	−30
Total priv...	84.2	6,817.5	5,478.6	+24
U. S. total..	**$170.0**	**$11,949.0**	**$12,831.9**	**−7**

Contracts by type of work

	This Week*	1953	1952	% chge
Waterworks .	$3.4	$190.8	$176.9	+8
Sewerage ..	7.0	346.0	232.5	+49
Bridges	6.5	531.9	315.2	+69
Highways ..	29.5	1,428.7	1,218.9	+17
Earthwork, waterways .	2.6	303.4	387.6	−22
Buildings:				
Public, excl. hsg.	23.6	1,348.5	3,851.4	−65
Housg., pub.	0.4	327.6	531.6	−38
Housg., priv.	46.8	2,896.5	2,403.4	+21
Commercial	12.2	935.1	501.0	+87
Industrial .	22.9	2,218.8	2,175.9	+2
Unclassified.	10.1	1,421.7	1,037.5	+37
Total	**$170.0***	**$11,949.0**	**$12,831.9**	**−7**

* 4-day week

NOTE: Minimum size projects included are: Waterworks and waterway projects, $34,000; other public works, $60,000; industrial buildings, $82,000; other buildings, $300,000.

New capital for construction

	Week of Oct 1 1953	Cumulative 40 Wks 1953	% chge 1952-53
Corporate securities	$86.8	$2,568.0	+20
State and municipal:			
Excluding housing	40.4	3,263.5	+36
Housing	19.8	232.7	−3
Federal loans	2.6	92.1	−70
Federal aid	...	770.9	+40
Total non-federal..	**$149.5**	**$7,927.2**	**+23**
Federal approp.:			
In U. S..........	...	1,566.7	−79
Outside U. S....	...	28.9	−85
Total new capital..	**$149.5**	**$9,522.8**	**−32**

ENR indexes

	1953	Base Years = 100 1913	1926	1949
Construction	**Oct**	**610.76**	**293.59**	**128.04**
cost	Sept	610.17	293.31	129.91
Building	**Oct**	**436.31**	**235.86**	**124.03**
cost	Sept	436.10	235.74	123.97
Volume	**Sept**	**487**	**198**	**141**
	Aug	487	198	141

OFFICIAL PROPOSALS

APPEAR HERE EACH THURSDAY. PROPOSAL ADVERTISEMENTS ACCEPTED UP TO 10:30 A.M. FRIDAY FOR THE ISSUE DATED THE FOLLOWING THURSDAY. SEND ALL ADVERTISEMENTS TO CLASSIFIED ADVERTISING DIVISION, 29TH FLOOR, McGRAW-HILL PUB. CO., INC., 330 W. 42 ST., N. Y. 36, N. Y.

Bids: October 15, 1953

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.,—Pursuant to the provisions of the Highway Law, and Article 2, Title 9 of the Public Authorities Law, and special provisions for projects financed with Federal Aid funds, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time on the 15th day of October 1953, by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 3 WILLIAM ROBINSON, District Engineer, 301 E. Water Street, Syracuse, New York						
Cayuga	FASS 53-16 FASS 53-17P	S.H. 590—Fosterville Co. Rd. 10; Fosterville-Throopsville Co. Rd. 10; FASS 51-25; Project S-364(2)	1.76	Bit. Mac. (Rd. Mix), Grad. & Pav.=1.63 Mi.; Bit. Mac. (Rd. Mix), Pav.=0.13 Mi.; Conc. Open Box Br. 31'	**$13,000** **Plans $10**	**$248,000**
DISTRICT No. 4 E. G. H. YOUNGMANN, District Engineer, Barge Canal Terminal, Rochester, New York						
Monroe	LOSP 53-4	Lake Ontario State Pkwy., Sect. C, East Manitou Road	0.97	Bit. Mac. Ty. 1=0.93 Mi.; Misc. Work=0.04 Mi.; Conc. Rigid Frame 104.7'	$40,000 Plans $15	**737,000**
DISTRICT No. 7 R. W. SWEET, District Engineer, 444 Van Duzee St., Watertown, New York						
Jefferson	FASS 53-15	Evans Mills-Chaufty's Corners (Co. Rd.) Project S-396(1)	1.99	T.C. Bit. Mac. Ty. 1=1.98 Mi.; Misc. Work=0.01 Mi.	**$9,000** **Plans $10**	**150,000**
DISTRICT No. 10 M. E. GOUL, District Engineer, Montauk Highway, Babylon, L. I., New York						
Bronx	FABRP 53-1	Bronx River Parkway (Southerly Extension) Project U-979(12), Cont. 2	5.60	Landscaping & Misc. Work	$6,000 Plans $10	115,000

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts and Accounts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to the "Controlled Materials Plan" of the National Production Authority as well as to regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instructions to Bidders."

When optional types are permitted on contracts with federal funds, bidders must state in the space provided in the proposal the exact designation of the optional type upon which the proposal is predicated.

The right is reserved to reject any or all bids.

B. D. TALLAMY
SUPT. OF PUBLIC WORKS

Official Proposals Columns

of ENGINEERING NEWS-RECORD

are MUST reading, each week, for contractors, engineering-construction companies, equipment and materials manufacturers, all over the United States.

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Official Proposal Division
ENGINEERING NEWS-RECORD
New York 36, N. Y.

OFFICIAL PROPOSALS

Bids: October 20, 1953

Installation of Transmissometer

THE PORT OF NEW YORK AUTHORITY
NEWARK AIRPORT
CONTRACT NA-220.011

Sealed proposals for the furnishing and installation of a weather measuring and recording instrument (Transmissometer) at Newark Airport will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1111, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, October 20, 1953, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Engineer of Materials of the Authority, Room 1111, and copies will be furnished upon deposit of $25.00 per set. The deposit shall be delivered to the Treasury Department, Room 1001, where a receipt in duplicate will be issued. A copy of the receipt shall be delivered to the Engineer of Materials who will furnish the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than forty days after the opening of proposals. The deposit will be forfeited if the documents are not so returned within the forty days.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman
New York, October 8, 1953

Bids: November 12, 1953

Cables and Suspenders For Suspension Bridge, Contract No. 5

DELAWARE RIVER PORT AUTHORITY
Administration Building
Camden, New Jersey

Sealed bids will be received for the construction of Cables and Suspenders for a Suspension Bridge over the Delaware River connecting Packer Avenue, Philadelphia, Pennsylvania and Gloucester City, New Jersey, known as Contract No. 5, at the office of the Executive Director of the Delaware River Port Authority, Administration Building, Bridge Plaza, Camden, New Jersey until 1:30 P. M. Eastern Standard Time, November 12, 1953 at which place and time they will be publicly opened and read by the Authority.

A more complete description of the work and full information for bidders are given in the Contract Documents and Specifications for this Contract, which may be obtained upon a deposit of $10.00 which will be remitted upon receipt of bid or the return in good condition of the copies so taken within thirty days after the opening of bids.

Each proposal must be accompanied by a certified check in the sum of $250,000 payable to the Delaware River Port Authority and drawn upon a National or State Bank or Trust Company having an office or place of business either in Philadelphia, Pennsylvania or Camden, New Jersey, and must not be enclosed with the sealed bid. The surety's consent must be shown. The bidder to whom the contract is awarded will be required to furnish a performance and Labor and Materialmen's Bond in the sum of 100 percent.

The Authority will afford prospective bidders an opportunity to inspect the site of the work.

The Authority reserves the right to waive any informalities in the bids received; to reject any or all bids, and to award the contract only to those experienced in this class of work and to the bidder whose proposal is deemed by the Authority to be most advantageous to the public interest.

DELAWARE RIVER PORT AUTHORITY
Joseph K. Costello
Executive Director

READ THE OFFICIAL
PROPOSAL COLUMN OF
ENGINEERING NEWS-RECORD
THIS WEEK AND EVERY WEEK

OFFICIAL PROPOSALS

Bids: October 20, 1953

Route 43 (1927) U.S. 30 (1953), Section 11-D

NOTICE IS HEREBY GIVEN that sealed bids will be received by the State Highway Department for:

Route 43 (1927) U. S. 30 (1953), Section 11-D, from Clarks Branch to Route 73 Interchange. Widening & Resurfacing, including Drainage Improvement at Watsontown Road, Camden County. Length 5.584 miles. The principal items of construction are:

Roadway Items

Estimated:

28,543	cu. yds.	Roadway Excavation-Earth
20,147	cu. yds.	Subbase
13,328	sq. yds.	Gravel Shoulders, 8" thick
49,908	sq. yds.	Macadam Base Course, 5" thick
21,869	tons	Pavement Type MA-BC-1 & 2
2,260	lin. ft.	Reinf. Concrete Pipe
2,297	lin. ft.	White Concrete Curb
5,328	lin. ft.	Wire Rope Fence
		Bridge Items
105	cu. yds.	Foundation Excavation
92	cu. yds.	Concrete in Structures
3,440	lbs.	Reinforcement Steel in Structures
700	lin. ft.	Timber Piles

Bids for the above will be received at the office of the State Highway Department, Assembly Room, Room 140, in the State Highway Office' Building, 1035 Parkway Avenue, Trenton, New Jersey, on Tuesday, October 20, 1953, at eleven o'clock (11:00 A.M.-EASTERN STANDARD TIME), and will be opened and read immediately thereafter.

The receipt and opening of bids is subject to the proper qualification of the bidder in accordance with the provisions of the prequalification law and the regulations adopted by the State Highway Commissioner. Bidders must also submit a revised financial statement and statement of plant and equipment with their bid.

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, New Jersey, and may be inspected by prospective bidders during office hours. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans upon application to A. Lee Grover, Chief Clerk, State Highway Department, Room 139, State Highway Office Building, 1035 Parkway Avenue, Trenton, New Jersey. Bids must be made upon the standard proposal forms in the manner designated in the standard State Highway specifications and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten percent (10%) of the amount of the bid, provided that the said certified check shall not be less than $500.00 nor more than $20,000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special addressed envelopes will be furnished on application. Bids not enclosed in sealed special addressed envelopes will be considered informal and will not be opened. The right is reserved to reject any or all bids.

Signed: STATE HIGHWAY DEPT.
A. Lee Grover, Chief Clerk

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4052) will be received at Stockton, Kansas, until November 17, 1953, for furnishing labor and materials for: Completion of Webster Dam, Webster Unit—Solomon Division, Kansas, Missouri River Basin Project. Location: South Fork of the Solomon River near Webster, Rooks County, Kansas. Principal items are: 7,420,000 cu. yds. excavation; 43,000 cu. yds. concrete; 3,380,000 lbs. furnishing and placing reinforcement bars; 64,750 bbls. furnishing and handling cement; 1,280,000 lbs. installing equipment and metalwork; and other work. Completion time 800 days. For particulars, address Bureau of Reclamation, Stockton, Kansas; or Building 53, Denver Federal Center, Denver, Colorado.

OFFICIAL PROPOSALS

Bids: October 20, 1953

Modification of Street Light Poles

LA GUARDIA AIRPORT
CONTRACT LGA-150.001

Sealed proposals for the modification of street light poles at La Guardia Airport will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1111, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, October 20, 1953, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Engineer of Materials of the Authority, Room 1111, and copies will be furnished upon deposit of $10.00 per set. The deposit shall be delivered to the Treasury Department, Room 1001, where a receipt in duplicate will be issued. A copy of the receipt shall be delivered to the Engineer of Materials who will furnish the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than forty days after the opening of proposals. The deposit will be forfeited if the documents are not so returned within the forty days.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman
New York, October 22, 1953

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entirely upon the

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They might not see your announcements if printed elsewhere.

You undoubtedly want their bids on your contracts.
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a line per issue.

OFFICIAL PROPOSALS

Bids: October 20, 1953

Clearing and Grubbing Pepacton Reservoir

CONTRACT 436

SEALED BIDS will be received by the Board of Water Supply, at its offices, thirteenth floor, 120 Wall Street, New York City, until 11:00 A.M., Eastern Standard Time, on Tuesday, October 20, 1953, for Contract 436, for clearing and grubbing the middle portion of the Pepacton reservoir, in preparation for the storage of water. The work will comprise the clearing of approximately 1,750 acres, the grubbing of about 550 acres, and required excavation and removal of excrementitious material, all as set forth in the specifications. This portion of the Pepacton reservoir is located in the Towns of Andes and Middletown, Delaware county, New York.

No bid will be received and deposited unless accompanied by a certified check upon a National or State bank, drawn and made payable to the order of the Comptroller of The City of New York, in the amount of forty thousand dollars ($40,000.00) for the proper execution of the contract.

At the above place and time the bids will be publicly opened and read. Pamphlets containing information for bidders, forms of bid and contract, specifications, contract drawings, requirements as to surety, etc., can be obtained in Room 1316 at the above address, upon application in person or by mail, by depositing the sum of five dollars ($5.00) in cash or its equivalent for each pamphlet. Within 30 days following the award of contract or rejection of bids, the full amount of such deposit will be refunded for each pamphlet submitted as a bid and a refund of four dollars ($4.00) will be made for each other pamphlet returned in acceptable condition. For further particulars, apply at the office of the Chief Engineer at the above address.

IRVING V. A. HUIE, President, RUFUS E. McGAHEN, EDWARD C. MAGUIRE, Commissioners, Board of Water Supply; BETTY COHEN, Acting Secretary.

Bids: October 27, 1953

Contract Nos. 39, 39A, 39B, 39C and 39D

Sealed proposals will be received by the West Virginia Turnpike Commission for:

The work to be done under these Contracts consists of the furnishing, erection and painting of corrugated steel guard rail, either or both steel and wood posts; timber shoulder curbs and other incidental work. This work is located between Princeton Mile 0 and Charleston Mile 88, Mercer, Raleigh, Fayette and Kanawha Counties, West Virginia, and is in connection with the construction of the West Virginia Turnpike in the State of West Virginia.

The principal items of work include:

Contract 39	Approximate Quantity Steel Posts Alternate 1	Wood Posts Alternate 2
Contract 39 Corrugated Steel Guard Rail (10 Ga.)	350,000 L.F.	350,000 L.F.
6 WF 8.5 x 6′-0″ Steel Posts with brackets	30,000 each	
6″ x 8″ x 6′-0″ Treated Wood Posts with brackets		30,000 each

Quantities tabulated above are divided approximately as follows:

39A-25%, 39B-30%, 39C-25%, 39D-20%

The subdivisions of Contract 39 are as follows:

39A Princeton (Mile 0) to Ghent (Mile 20)

39B Ghent (Mile 20) to Maynor (Mile 42)

39C Maynor (Mile 42) to Standard Tunnel (Mile 68)

39D Standard Tunnel (Mile 69) to Charleston (Mile 88)

Proposals will be received at the office of the West Virginia Tunpike Commission, 1340 Wilson Street, Charleston 5, West Virginia until 1:00 P.M. Eastern Standard Time, and thereafter at the House of Delegates Chamber, State Capitol, Charleston, West Virginia until 2:00 P.M. Eastern Standard Time, on October 27, 1953, at which time and place said proposals will be publicly opened and read.

WEST VIRGINIA TURNPIKE COMMISSION
D. H. Morton, Chairman

EMPLOYMENT

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

WANTED—BUILDING Construction Estimator—By old established North Jersey Company—Must be experienced with emphasis on Industrial Construction. Must have engineering background and be able to handle the complete estimate. Excellent Salary—Profit Sharing—Opportunity to advance—Age 32-42. P-9232, Engineering News-Record.

ENGINEER—HEAVY Construction—Extensive experience in Highway Bridges—Overpasses—Foundations—Excavation—Water Conditions—Concrete in all phases. Must be able to handle bidding—Cost analysis. Profit Sharing—Fine Opportunity if capable. P-9233, Engineering News-Record.

BUILDING CONSTRUCTION Sales Engineer—To contact Industrial Firms for design and construction services. Must have construction engineering or architectural experience. Should have some established contacts but will consider ambition, intelligence and interest of applicant. Minimum salary $10,000, plus Profit Sharing. P-9234, Engineering News-Record.

HELP WANTED Male Building Estimator and Quantity Take-Off Man. Graduate Engineer preferred. Thoroughly experienced, permanent position with well established contractor with top-notch organization bidding competitively public works and commercial buildings throughout the South. Stanley W. Newman Company, Inc., P. O. Box 1646, Mobile, Alabama.

STRUCTURAL & MISC. Steel detailer—must be experienced, excellent climate, good housing conditions, top wages. Give full particulars, Tucson Iron Works, Box 1949, Tucson, Arizona.

BRIDGE DESIGN Engineer experienced in highway bridge design. Capable of executing complete design calculations and supervising group for preparation of highway bridge contract plans for expressway project located in Maryland. Salary $7,500 per year. Furnish full information regarding education, age, experience, and references. Replies confidential. P-9317, Engineering News-Record.

HIGHWAY BRIDGE Design Engineer fully experienced in highway bridge design. To take full charge of bridge department on large expressway project located in Maryland. Reply stating education, experience, age, references. Salary open. Replies confidential. P-9318, Engineering News-Record.

ENGINEER-ESTIMATOR. Young graduate civil engineer with heavy construction field experience and capable of assuming increasing responsibility leading to position as chief estimator for prominent general contractor operating throughout South and Southwest. Write full particulars, including education, availability, personal details and salary requirements to P-9302, Engineering News-Record.

WANTED EXPERIENCED designer, with proven record in development of air actuated percussive tools as used in mining and construction industries. Also junior engineers with design aptitude to enter the engineering departments. Location—New York State. Apply, listing experience in full to P-9358, Engineering News-Record.

ARCHITECTURAL DRAFTSMAN and Designer, experienced. State age, experience, education, salary expected and when can report. Position permanent. P-9384, Engineering News-Record.

ENGINEER EXPERIENCED on design and supervision of construction of water works, sewers, water treatment, sewage treatment, industrial buildings. State age, experience, education, salary expected and when can report. Position permanent. P-9385, Engineering News-Record.

SALES TRAINEE. Large steel manufacturer looking for young sales trainee with technical college education. One or two years experience required in construction, sales, or sales promotion of steel or concrete products. Salary. Write giving age, education, experience, personal qualifications, etc. P-9379, Engineering News-Record.

(Continued on the opposite page)

WANTED

GENERAL SUPERINTENDENT

Large construction firm in the South interested in securing the services of a full time General Superintendent for large project work. This man should have building construction background with experience in mass housing, office buildings and heavy construction work. To the right man we are willing to pay an excellent salary and bonus. Age between 35 and 45. Please send full particulars about background, personal habits, age and references to

P-9389, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

WANTED

Large manufacturer of construction equipment wants man with considerable field experience in construction work . . . buildings, tunnels, bridges, etc., with particular emphasis on concrete placement. Estimating experience advantageous. Sales experience preferred but not necessary. Excellent salary and benefits. Write

P-9258, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

WANTED

ESTIMATOR

Experienced construction estimator Southern part of the country. Familiar with all types of building construction. Steady employment and good salary offered to qualified man. In letter please state capabilities, experience, age and references.

P-9392, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

WANTED

SUPERINTENDENT

Large eastern quarry operator has opportunity for experienced superintendent. Write giving full experience, references, age and salary.

P-9395, Engineering News-Record
330 W. 42nd St., New York 36, N. Y.

WANTED!!

CHIEF ESTIMATOR

Substantial western building contractor, main office Los Angeles, has exceptional opportunity for Chief Estimator experienced in commercial and industrial work. Reply giving complete qualifications and salary range. Strictly confidential.

P-9338, Engineering News-Record
1111 Wilshire Blvd., Los Angeles 17, Calif.

BRIDGE - HIGHWAY ENGINEERS
DESIGNERS - DRAFTSMEN

For work on major bridges, expressways, and turnpikes. Permanent positions with periodic promotions depending on experience and ability. Paid vacations, sick leave, hospitalization and life insurance. Include experience, salary requirement in first letter. Photograph optional.

Howard, Needles, Tammen & Bergendoff
Consulting Engineers
1805 Grand Ave., Kansas City 8, Mo.

WANTED

Paver Sales Specialist

Leading manufacturer of paving equipment interested in man to act as paver sales specialist. Should have considerable experience in road paving and be familiar with all types of concrete pavers.

SW-9263, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

OPPORTUNITY

For man with proven sales ability

Manufacturer of self-priming centrifugal pumps desires man to head Pump Department. Engineering experience preferred but not necessary. Excellent salary and benefits. Plenty of opportunity for right man to grow. Write

SW-9262, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

SALARIED POSITIONS $3,500—$35,000

We offer the original personal employment service (established 43 years.) Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars.

R. W. BIXBY, Inc., 272 Dun Bldg., Buffalo 2, N. Y.

Don't forget the

BOX NUMBER

When answering the classified advertisements in this magazine. don't forget to put the box number on your envelope. It's our only means of identifying the advertisement you are answering.

POSITIONS VACANT

(Continued from opposite page)

CONSTRUCTION SUPERINTENDENT—concrete structures, N.Y.C. public schools and similar. $10,000.00 caliber. Salary and bonus with good future. Complete resume to P-9373, Engineering News-Record.

STRUCTURAL DRAFTSMAN, 2 years exp. as Mech. Draftsman; 4 years exp. as structural steel detailer; one year (and presently) working as structural draftsman and checker (for incoming shop drawings) with structural department of an architectural company. Shall immigrate from Canada to U.S.A. Looking for permanent position with a well known company, preferably in New York City (Manhattan), but ready to go any where (North East) which has possibility of future. In reply please mention salary that can be expected. P-9374, Engineering News-Record.

DESIGN ENGINEERS—Men having experience in design and preparation of drawings and reports for highway, sanitary sewer, water distribution and municipal-type storm drainage systems. Good pay for qualified men with training and experience. Opportunity for advancement. Furnish full information regarding education, training and experience, age, references and salary required. Replies strictly confidential. Department of Public Works, Baltimore County, Towson 4, Maryland.

SELLING OPPORTUNITIES OFFERED

SALES ENGINEERS—Albany, New York and Pittsburgh, Pennsylvania with established national concern selling prefabricated metal products to engineering and construction markets. Position offered is permanent and presents excellent future with aggressive, progressive and expanding organization. Engineering degree desirable. Previous sales experience unnecessary. Age 24 to 30. SW-8254, Engineering News-Record.

SALES AGENCY offered to man now con contacting architects and industrials for product specifications. This proven item in the construction line now successfully handled as sideline by such persons. $250,000 yearly potential in industrial areas. Straight 5% commission with complete protection. Liberal manufacturer aid via published advertising and direct mail. Many choice territories still available. RW-8736, Engineering News-Record.

EMPLOYMENT SERVICE

FOREIGN CONSTRUCTION—Comprehensive Listings, Jobs & Overseas Contractors $1.00—Cove-McKane, P. O. Box 126, NY 4, NY.

SPECIAL SERVICE

NOTICE TO Bridge Engineers: Bids will be received on October 27, 1953 for engineering services in connection with a double leaf bascule superstructure and supporting piers for a bridge over the Intracoastal Waterway near Charleston, S. C. Details may be obtained from the undersigned. C. R. McMillan, Chief Highway Commissioner, S. C. State Highway Department, Columbia, S. C.

POSITIONS WANTED

STRUCTURAL ENGINEER, licensed graduate, 28 years office and field, industrial buildings, chemical plants, waterfronts, underground structures, etc., available for permanent responsible position. PW-9195, Engineering News-Record.

(Continued on the following page)

CHIEF CONSTRUCTION ESTIMATOR

15 years experience:
Cost Estimating
Architectural Specification Writing
Architectural & Structural Design
Age 39 . . . . available 3 weeks
Sober, industrious, non-temperamental. Write for resume.

PW-9306, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

AVAILABLE

Project Manager, age 39. BSCE. excellent health, 18 yrs. broad experience industrial-chemical construction management multi-million dollar projects. Know costs, negotiation, labor and customer relations. Excellent references and connections. Available Oct. 1st.

PW-9197, Engineering News-Record
520 N. Michigan Ave. Chicago 11, Ill.

DESIGN ENGINEERS

With experience applicable to Oil Refinery, Blast Furnace or Steel Plant Design.

Openings available at our Cleveland, Ohio, Tulsa, Oklahoma and Union, New Jersey offices:

Piping Designers
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These openings offer:

Top Hourly Rates
Permanent Positions
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No Age Limitations

Write, giving complete background and experience to:

ARTHUR G. McKEE & CO.
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CLEVELAND 1, OHIO

ENGINEERS for HIGHWAY DESIGN

Are you interested in a career service with the Maryland State Roads Commission?

The Division of Road Design, offers *Permanent Positions* to qualified men in order to carry out its extensive construction program. This is not just another job offer. This is an opportunity to become affiliated with a forward looking state highway department next door to the National Capital. Wanted especially are:

Young graduates in Civil Engineering. If not graduates, applicants must have considerable successful experience in Highway Design.

Qualified applicants will be employed immediately pending Merit System examination which will be held several months after employment. Immediate vacancies available to qualified men as:

Junior Assistant Highway Engineer II . . $4013-4813 per annum

IN ADDITION, every position with the Maryland State Roads Commission means:

1. **Immediate Employment at Base Salary**
2. **Annual Salary Increments (over period of 5 years)**
3. **Merit System Protection**
4. **Opportunities for Advancement**
5. **Annual Leave with Pay (15 days, cumulative to 30)**
6. **Generous Sick Leave with Full Pay**
7. **Liberal Retirement Benefits**

Address W. Phelps Thomas, Personnel Manager, Maryland State Roads Commission, Tower Building, Baltimore 2, Maryland for application today.

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STRUCTURAL DESIGN

Engineer representatives with established regional contracts required to obtain engineering contracts for leading firm of Prestressing Consultants. Many territories open. Write

P-9387, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

Engineers—Foremen—Office Men

Learn latest methods to organize and run work. Prepare for the top jobs.
Send post card for details.
GEO. E. DEATHERAGE & SON
CONSTRUCTION CONSULTANTS
411 So. 5th Ave. Lake Worth, Florida

POSITIONS WANTED

(Continued from preceding page)

CONSTRUCTION EXECUTIVE. Grad. Eng. 20 years successful background field and administrative management in all fields of construction, present salary $12,000. Desire change to position that offers possibilities and future security. PW-9188, Engineering News-Record.

ENGINEER FOR Japan. Industrial, Construction exper. Immediately avail. Constr. Plant, Install-service. Design, field, sales. Box 52, Main P.O. San Francisco.

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CONSTRUCTION SUPERINTENDENT 25 yrs. experience on sewage and water plants, bridges, wharfs, schools and industrial buildings. Competent estimator. PW-9307, Engineering News-Record.

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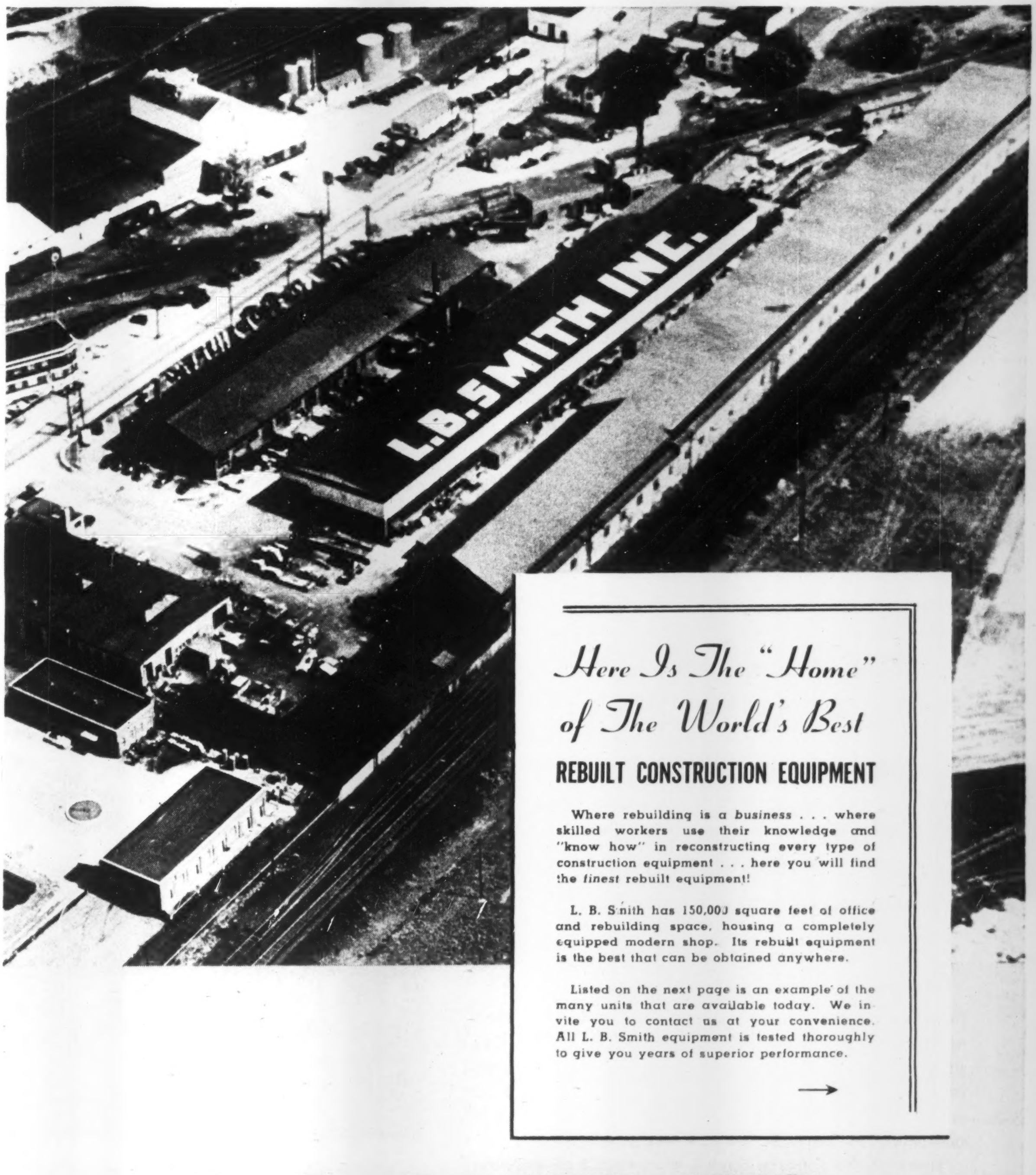

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VOL. 2 **NO. 6**

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2—Worthington two-stage, water-cooled, vertical compressors, 7 & 6 x 6, 60 CFM at 450 RPM, with pressure gauge designed to cut in at 200 pounds and cut out at 250 pounds, complete with Twin-Disc clutch, but without power or air receiver. Practically new condition.

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2—Gardner-Denver 500 cubic foot, 7¾ & 6 x 6, portable air compressor, powered by Caterpillar D13000 diesel engines and mounted on four steel wheels. Rebuilt.

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1036/2418 Cedarapids Junior Tandem crushing plant with feeder, hopper and grizzley, 1036 jaw, 2418 roll, 3' x 10' double deck vibrating screen, all necessary drives, chutes, plant conveyors and all mounted on semi-trailer truck with eight 9.00 x 20 tires, tandem rear, with air brakes and powered by International UD18A diesel engine. Reconditioned.

Cedarapids "Rock-It" plant with 30" x 8' feeder, 2225 jaw crusher, 3033 hammermill on semi-trailer truck with pneumatic tires, front dolly, air brakes, 42" x 10' double deck AG lime screen, all plant conveyors, controls, chutes, etc., but without power. New.

2020 Cedarapids type CR-4 double impeller impact breaker mounted on I-beam base, countershaft V-belt drive, end type feed chute, operator's platform and hand ladder. New.

936 Telsmith-Wheeling overhead eccentric roller bearing mounted jaw crusher with grooved flywheel, weight 11,150 pounds. Horsepower required—20-35, capacity 30-36 tons at 1½" opening, 15-18 tons at ¾" opening.

10x7 Allis Chalmers Blake type jaw crusher requiring 7 horsepower to operate, capacity 5 tons per hour with 2" setting, 4 tons per hour at 1½" setting, and 2½ tons per hour at 1" setting, for flat belt drive, weight—6500 pounds. Rebuilt.

B-3 Jeffrey swing hammer pulverizer, 20 x 12, with 11" x 11" feed opening, 2⅝" x 18" diameter flywheel and flexible coupling, capacity 6-8 tons per hour with 1" grates, weight—2200 pounds, no power included. Requires 12-20 horsepower to operate. Rebuilt.

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Lorain L-57 crawler mounted shovel with 24" width pads, powered by Caterpillar D11000 diesel engine, 1¼-yard dipper.

Lorain MC4 Moto-Crane powered by MCR Waukesha gasoline engine mounted on Lorain Moto-Crane chassis powered by 6SRKR Waukesha gasoline engine, 11.00 x 20 tires all around, 30' standard crane boom and precision boom lowering device.

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Link-Belt Model LS50 combination ½-yard shovel and backhoe.
Bucyrus-Erie Model 10B shovel.

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9	40D40713	1950	3608	**4,000.00**	Syracuse, N. Y.
10	40D40824	1950	2770	**5,000.00**	Green Island, N. Y.
11	40D41701	1951	2970	**5,500.00**	Syracuse, N. Y.
12	40D42508	1951	2798	**6,000.00**	Syracuse, N. Y.
13	40D42682	1951	1662	**6,800.00**	Green Island, N. Y.

14 **IK315** Mobil air, serial 40T12646, powered by International Harvester Model UD18A diesel engine and mounted on four pneumatic tired wheels **Price $2,000.00** Green Island, N. Y. Purchased 1942

15 **GKA315** Mobil air, serial 40T11891, powered by Waukesha Model 145GK gasoline engine and mounted on four steel wheels. Purchased 1941; Approx. 8190 hrs. **Price $500.00** Syracuse, N. Y.

K315 Mobil air powered by Waukesha Model 145GK gasoline engine and mounted on four steel wheels

Item	Serial No.	Purchased	Price	
16	40T10439	1941	**$1,000.00**	Green Island, N. Y.
17	40T5331	1939	**1,000.00**	Syracuse, N. Y.
18	40T5333	1939	**500.00**	Syracuse, N. Y.

19 **GKA105** Mobil air, serial 40G41909, powered by Waukesha Model 130GS gasoline engine and mounted on two pneumatic tired wheels Purchased 1951; Approx. 2666 hrs. **Price $1,650.00** Green Island, N. Y.

20 **GK105** Mobil air, seria. 40T28785, powered by Waukesha Model 130GS gasoline engine and mounted on two pneumatic tired wheels Purchased 1946. Approx. 1310 hrs. **Price $1,800.00** Green Island, N. Y.

D-85 Mobil air powered by Waukesha Model XAH gasoline engine and mounted on two pneumatic tired wheels

Item	Serial No.	Purchased	Approx. Hrs.	Price	
21	40T42279	1951	1100	**$1,800.00**	Syracuse, N. Y.
22	40T37834	1949	3000	**900.00**	Syracuse, N. Y.

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26 **500** Chicago Pneumatic serial #41028 powered by Caterpillar Model 13000 diesel engine mounted on four steel wheels **Price $5,000.00** Syracuse, N. Y.

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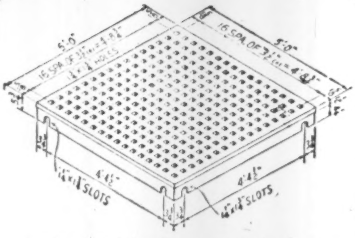

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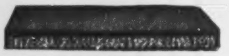

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20"	5	1/8"	1/32"	28 Oz.
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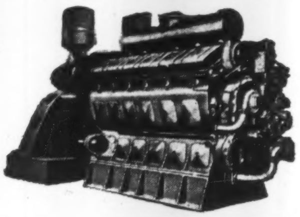

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500	General Motors	8-278A	750	720	150	Buckeye	80	240	600
500	General Motors	8-567	720	720	100	Worthington	BB-5	150	600
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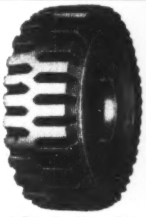

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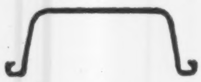

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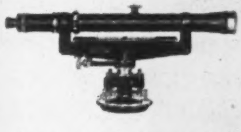

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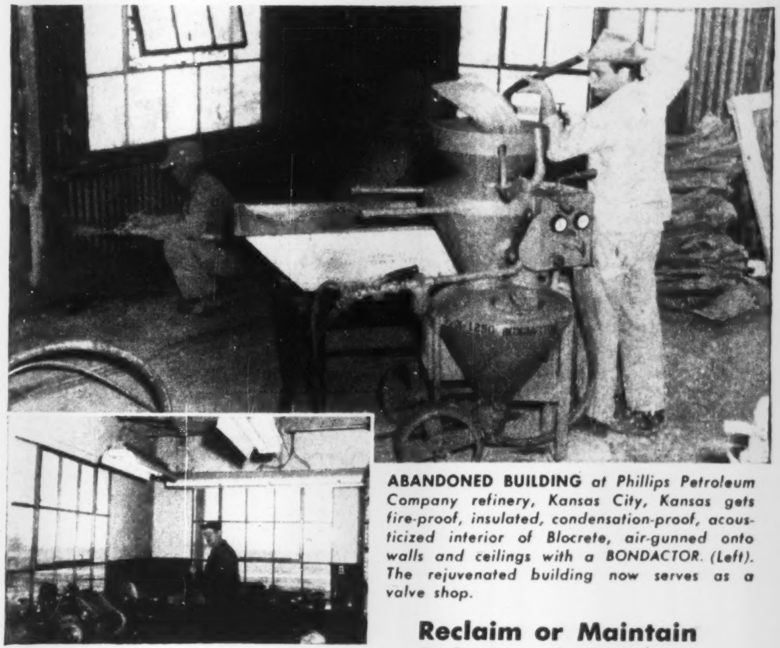

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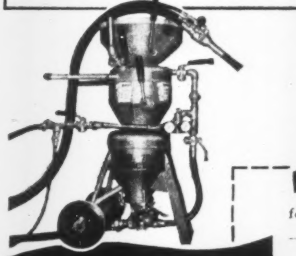

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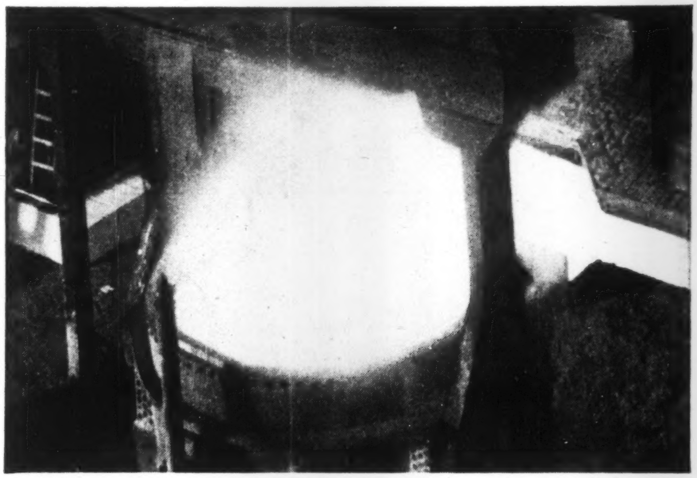
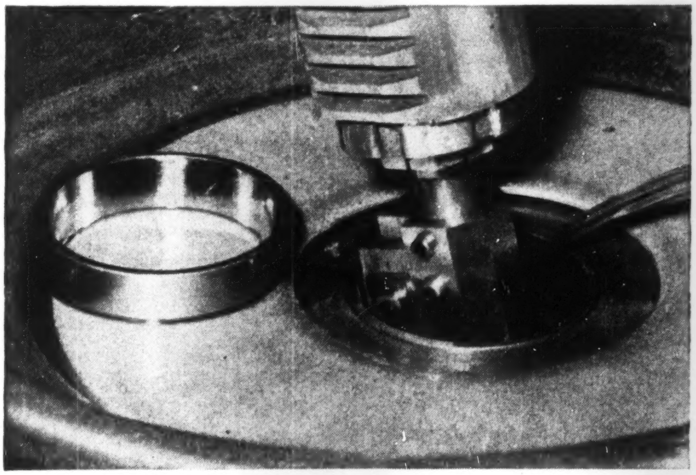
500 Second St., Benton Harbor, Mich., U.S.A.

FROM START . . .



WE MAKE OUR OWN STEEL to insure top quality from start to finish. The special grade alloy steels which give Timken bearings their strength and resistance to wear are made in our own steel mills.

TO FINISH . . .



FINISHED TO CLOSER TOLERANCES. Finishing of rollers and races to incredible smoothness accounts for the precision performance of Timken tapered roller bearings.

TIMKEN® bearings give you more for your money than any other bearing

TIMKEN® bearings are the only bearings that give you all these advantages: advanced design, precision manufacture, rigid quality control, special analysis Timken steels. That's why you should be sure that the tapered roller bearings you use are Timken bearings. Always look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

TIMKEN
TRADE-MARK REG. U.S. PAT. OFF.
TAPERED ROLLER BEARINGS

NOT JUST A BALL   NOT JUST A ROLLER   THE TIMKEN TAPERED ROLLER   BEARING TAKES RADIAL   AND THRUST   LOADS OR ANY COMBINATION